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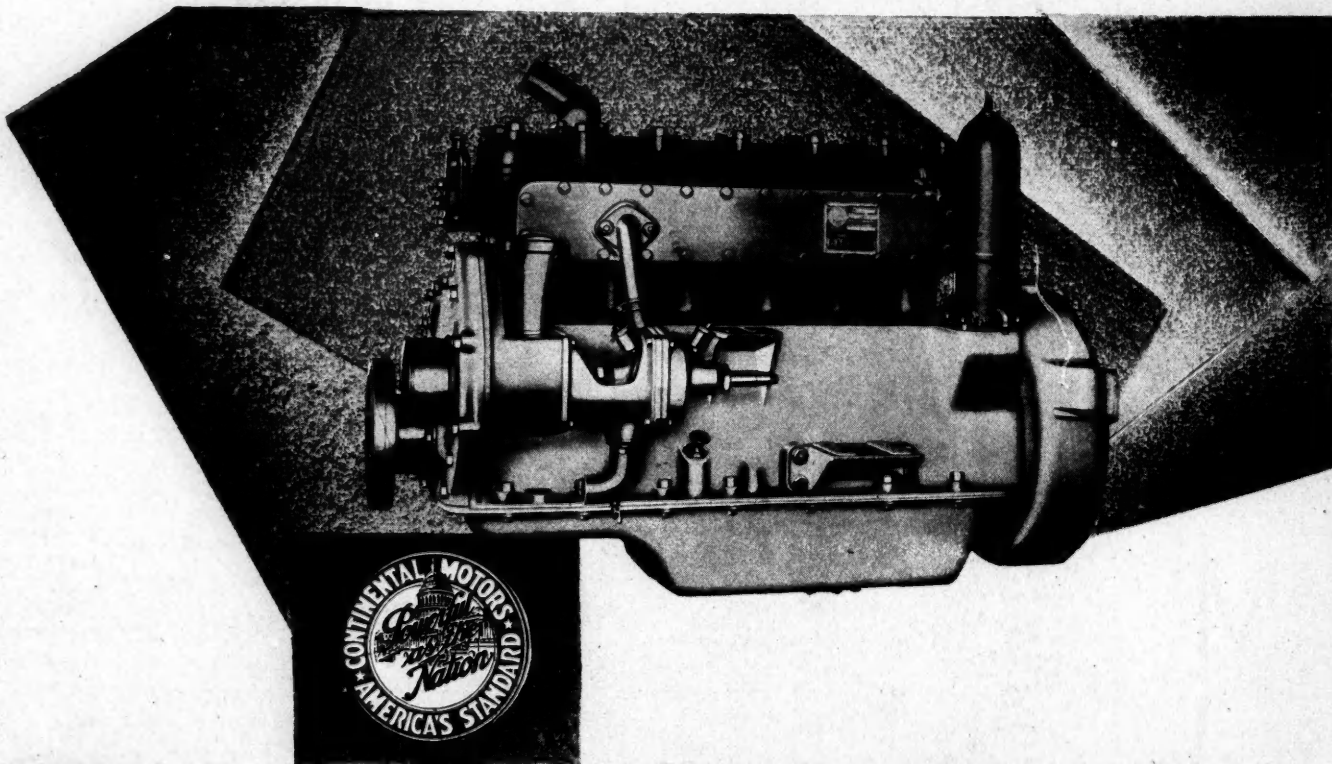
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Vol. 60

No. 24

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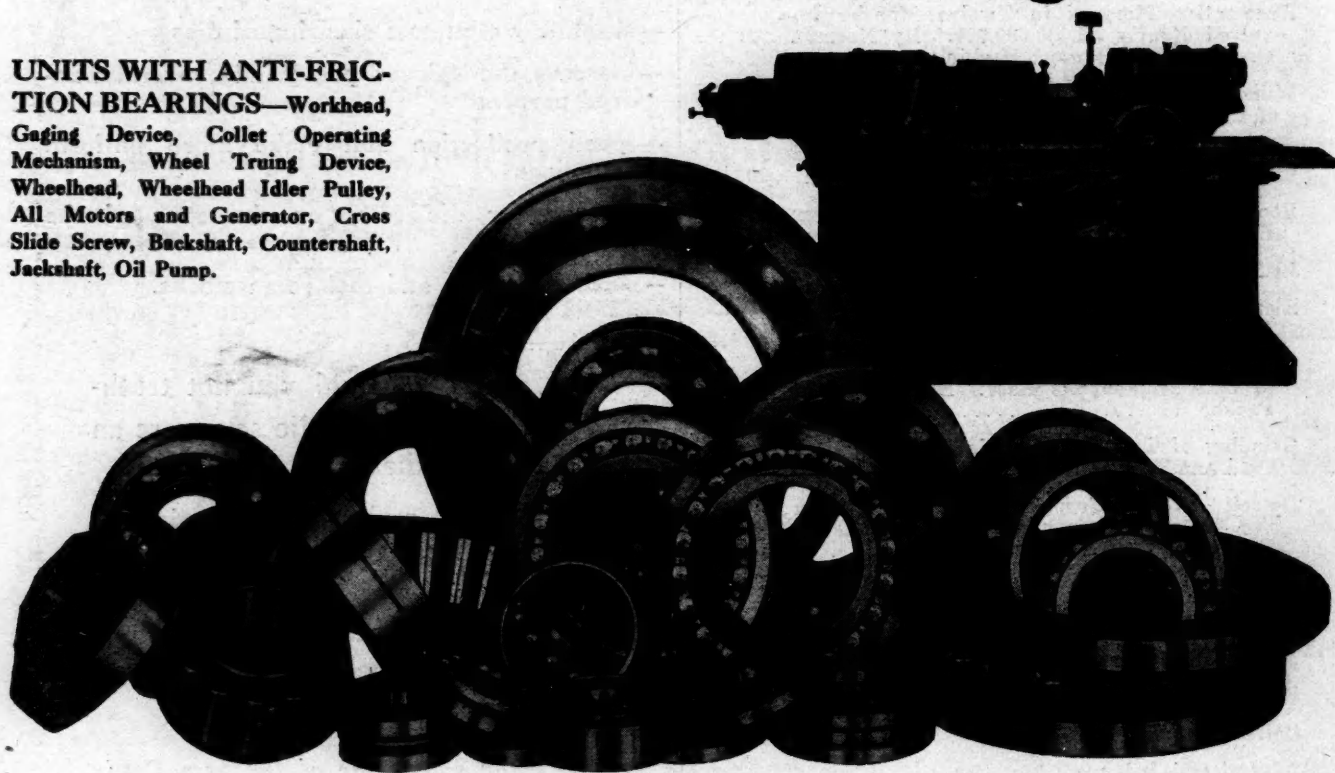
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AUTOMOTIVE INDUSTRIES

VOLUME 60

Philadelphia, Saturday, June 15, 1929

NUMBER 24

Automotive Mergers in Twelve Months Involved Nearly \$2,000,000,000

Greater proportion of consolidations was among non-competitive firms. Future combinations between competitors expected to be more numerous.

By NORMAN G. SHIDLE and HERBERT HOSKING

MERGERS. — Combinations. —Consolidations.

During the last twelve months they have continued to appear throughout the automotive field in great profusion. Mergers in the industry completed since June, 1928, involve companies whose assets total close to \$2,000,000,000. General Motors Corp. alone has spent about \$70,000,000 in the last year from the acquisition of whole or part interest in new companies and new fields.

Some of the largest consolidations, from the standpoint of dollars involved, were of non-competitive organizations. A majority of those which took place specifically in the parts and accessory end of the business, however, were of companies which previously had been manufacturing more or less competitive products. But the margin of competitive over non-competitive mergers was not great even in this particular branch of the industry, 58 per cent of those taking place being of the competitive type. It is interesting to note that of the important mergers in the parts and accessory field during the twelve months previous—from June, 1927, to June, 1928—the percentages were just reversed, 57 per cent having been of the non-competitive type and 43 per cent of the competitive type.

Only two passenger car combinations have taken place since June, 1928; the Hupp purchase of Chandler-Cleveland and the acquisition of Pierce-Arrow by Studebaker. In the former case many of the lines had been competitive, but Studebaker and Pierce-Arrow were practically non-competitive.

The half dozen combinations which have taken place among motor truck manufacturers in the last year have been chiefly of the competitive type. Thus the truck industry has continued a normal trend which has been under way for a number of years.

Consolidations in the aviation field have been of both competitive and non-competitive types and have been coming so fast as to make difficult the preparation of an accurate detailed account of the current situation on any given day.

Looking back over the whole group of automotive mergers, it can hardly be said that either general type of combination has predominated during the last twelve months any more than it did during the previous twelve. And it is logical that this should be the case, since two major economic forces lie behind the whole merger movement. One—which tends to result in the competitive type of combination—comes about largely through over-capacity in a given field, excessive merchandising costs or unfavorable price situations generated by this excess capacity, or perhaps through search for a way out of serious patent litigations and contentions.

This type of combination, in other words, usually has its gestation in purely economic forces, coming about sometimes as a necessity and sometimes well in advance of the necessity period.

Non-competitive units which have been combined in the automotive field have on the other hand often been the result of banking interests seeking promotion or investment

opportunities. While important banking interests frequently have been involved in merger developments of the competitive type, it would seem from a survey of the records as though the bankers leaned toward the vertical rather than the horizontal organization as having greater appeal from a promotion viewpoint.

While this arbitrary division of genesis of the two types of mergers is obviously inaccurate when applied to certain specific instances, study of the background of the consolidations made since June, 1928, make it at least an attractive idea to speculate about.

What of the future?

Only a very brave man would pretend to forecast. The speculations of an executive familiar with both the banking and automotive sides of the economic picture propounded just the other day may be of some interest, nevertheless.

There will continue to be a lengthy parade of consolidation in the automotive industry during the next year, this executive believes, but the total number may be slightly less than in the 12 months just passed. He believes further that mergers of competitive type may form a larger percentage of the total in the next year than they have in the last.

He reasoned something like this: The present condition of the stock exchange and the money market indicates that the demand for new issues of securities will not be as favorable during the next 12 months as it has been in the last. The possibility of profit through such flotations has been one of the major incentives to banking interests to promote automotive mergers; and generally speaking the bankers voluntarily have promoted the non-competitive type.

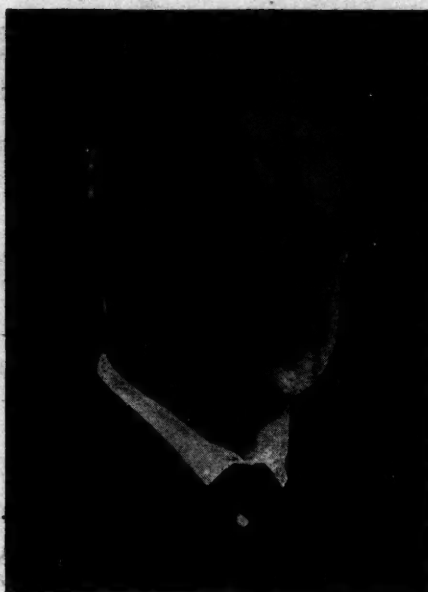
With competition increasing in intensity, on the other hand, mergers of competing organizations — brought about as they frequently are by the impetus of fundamental economic forces — seem likely to continue at about the same rate as in the recent past.

Such non-competitive consolidations as take place, this executive thinks, will be largely the result of well-established organizations reaching out for greater control either of their supply sources or their wholesale and retail markets. Continuance of such activities on the part of large, established organizations, he considers certain.

Unabated Vigor to Trend

Whatever the merit of this man's prognostications, the fact remains that the trend toward merging and consolidating continued with unabated vigor in the period between June, 1928, and June, 1929. (Articles appearing in *Automotive Industries* during the months of June and July, 1928, covered the developments in this regard for the twelve months preceding that time.)

Among the largest consolidations to become public in the last year the following were prominent: Bendix Aviation Corp., involving companies with total assets approximating \$130,000,000; the United Tractor and Equipment Corp., involving 35 manufacturers, distributors, and a finance company interested in the manufacture and sale of farm implements, tractors, industrial locomotives, etc., and showing pyramided assets of \$150,000,000; the United Aircraft & Transport



Charles D. Hastings, president, Hupp Motor Car Co., which absorbed Chandler Motors Corp.

Corp., bringing together aircraft engine, plane, manufacturers and transport companies; the Aviation Corp., a Harriman financed investment trust for holding and developing all kinds of aircraft companies; Pierce-Arrow Motor Car Co., and the Studebaker Corp. of America, involving combined assets of about \$153,000,000, and the Hupp-Cleveland-Chandler combination uniting assets of nearly \$135,000,000.

Purchase of the Opel Motor Works of Germany by General Motors involved a consideration of \$30,000,000. The farm implement and industrial equipment field saw also the merger of the Oliver Chilled Plow Works with the Nichols & Shepard Co. of Battle Creek, Mich., and the Hart-Parr Co., Charles City, Ind., three of the oldest companies in the tractor and implement field, as the Oliver Farm Implement Co. Assets of more than \$50,000,000 figured in the combination.

A very recent entry into the field of aviation holding companies is Porterfield Aviation Interests, Inc., which was formed to acquire American Eagle Aircraft Corp. and the Lincoln Airplane Corp. and which is capitalized at \$25,000,000.

A detailed resume of the mergers which have taken place since June, 1928, in the field of automotive interest, follows:

Mergers in the aviation field during the period since last June have represented by far the greatest amount of capital involved in automotive industrial mergers during the period, and have involved the greatest number of companies under the strongest concentration.

Aviation Corp. Outstanding

Heading the list is the Aviation Corp., a holding company whose combined securities have a market value of approximately \$200,000,000. Closest approaching this in magnitude is the United Aircraft & Transport Corp. with securities valued at \$150,000,000, and the Bendix Aviation Corp., with securities valued in the neighborhood of \$130,000.

Formation of the Detroit Aircraft Corp. was announced last week by a group of executives in the automobile industry. Nine aircraft companies were acquired by the new corporation, which was capitalized at approximately \$20,000,000. The component companies, described in detail on page 920 of this issue, were Mahoney-Ryan Aircraft Corp., Aircraft Development Corp., Winton Aviation Engine Co. (partly owned only), Eastman Aircraft Corp., Blackburn Aeroplane Co. of Mich., Lockheed Aircraft Co., Marine Aircraft Co., Aviation Tool Co., Grosse Isle Airport, Inc. Inclusion of the companies listed above gives the new venture a high degree of integration, particularly as the plans of the corporation include building a full line of lighter-than-air craft as well as heavier-than-air craft and aviation engines. E. S. Evans, president of the Evans Auto Loading Co., and interested in a number of automobile and aircraft companies, is president of the Detroit Aircraft Corp., which, it is announced, will be an operating company in every sense of the word.

June 7 stockholders of the Simon Airplane Appliance

Co. and the Heywood Starter Corp. approved the consolidation of the two companies, forming a new company to be known as Sky Specialties Corp., with 200,000 shares no par capital stock authorized, of which 125,303 shares will be outstanding. Heywood Starter Corp. has 65,303 shares, and Simon Airplane Appliance Co., 60,000, which will be exchanged for shares in the new corporation on a share-for-share basis. Arthur L. Cash will be president of the Sky Specialties Corp.

Manufacture of the Comet aircraft engine was transferred from Oakland, Cal., to Madison, Wis., following the acquisition of the business by the Gisholt Machine Tool Co. and other interests. The Comet Engine Corp. was organized to continued manufacture of the Comet engine.

In addition to these mergers, which have assumed fairly definite outline, the aviation industry has in the past year gone through a period of shuffling to such an extent that there is perhaps more interrelation between all the larger units involved than in any other industry of similar magnitude having the same number of apparent divisions. There is an exchange of directorates, alliance of interests and policy, to such an extent that it is virtually impossible at the present time to determine the strict line of competition between the various groups.

In the Bendix Aviation Corp., for example, there are united the interests of most of the other groups, because the Bendix Aviation Corp. controls the divisions which make accessories used by the majority of planes produced in this country.

The Aviation Corp. was incorporated in Delaware, March 1, 1929, as a holding and developing company for the aviation industry. March 23 it definitely entered the manufacturing end of the industry with the announcement of purchase of control of Fairchild Aviation Corp. on an exchange of stock basis which was not announced. It was indicated that a site would be purchased and a factory erected for the manufacture of airplanes, the new company to come under the control of the Aviation Corp. The Fairchild Aviation Corp. was a holding company for five other companies operating under the Fairchild name and in addition owned the controlling interest in the Kreider Reisner Aircraft Co., of Hagerstown, Md. Besides owning a number of transport companies, the Aviation Corp. owns and operates the Curtiss and Roosevelt Fields.

Porterfield Aviation Interest, Inc., was formed during May to acquire the American Eagle Aircraft Co. and the Lin-

coln Aircraft Co. It was announced that the capitalization of the new company would reach \$25,000,000 in effect.

The United Aircraft & Transport Corp. was formed December 17 by the merger of the interests of the Boeing Airplane & Transport Co., the Pratt & Whitney Aircraft Co., and the Chance Vought Corp. Companies later included were the Hamilton Aero Manufacturing Co., and the Hamilton Metalplane Co., of Milwaukee.

Pratt & Whitney Aircraft Co. was organized in July, 1925, as a subsidiary of Niles-Bement-Pond Co., which also controls the Pratt & Whitney Co., machine tool manufacturer, whose facilities are open to the aircraft company when necessary.

The Boeing Aircraft & Transport Co. controls a number of subsidiaries, particularly transport lines, and since its organization the principal development of the United Aircraft has been in the direction of acquiring interests in the transport end of the business.

The United Aircraft & Transport Corp. is financed largely by the National City Co.; and the Aviation Corp., by the W. A. Harriman interests. W. E. Boeing, president of Boeing Airplane & Transport Co., is chairman of the board of United Aircraft, and F. B. Rentschler, president of Pratt & Whitney Aircraft Co., is president. C. F. Kettering of General Motors and W. B. Mayo, chief engineer of the airplane division of the Ford Motor Co., are included on their board of directors.

General Motors Extensions

During the year General Motors Corp. was active in acquiring and buying an interest in several companies which would supplement or strengthen its position in several fields. The Guide Motor Lamp Co., of Cleveland, manufacturer of lamp assemblies, was acquired October 23, 1928, by the payment of \$913,690 for the company, through an agreement with the stockholders. The stockholders received \$175 for their common stock and \$110 plus accrued dividends for 30 days on the preferred. The company is reported to have been doing a business of \$3,000,000 annually at the time of purchase.

February 4, 1929, General Motors Corp. of Canada, Ltd., acquired control of McKinnon Industries, Ltd., a company manufacturing gears, radiators, axles, etc., with two plants at Ste. Catherine's, Ontario, and two at Buffalo, by exchange of three-quarters of a share of new General Motors stock for each share of McKinnon stock. By March 1, 93 per cent of the stock had come under General Motors control, through the exchange plan. Assets of



Alfred P. Sloan, Jr. (left), president, and C. E. Wilson, assistant to the president, General Motors Corp., who were active in acquisitions of new properties for their company

the McKinnon Industries are listed at \$4,054,314.

The company was organized in 1925 to acquire the business of the McKinnon Industries, Ltd., of Ste. Catherine's and the capital stock of the McKinnon Dash Co., Buffalo. These businesses were founded about 1875. The holding company later acquired the business of J. H. Williams, Ltd., of Ste. Catherine's. Acquisition of McKinnon Industries raises the number of General Motors manufacturing units in Canada to four.

On March 18, Alfred P. Sloan, Jr., president of General Motors, announced the purchase of an interest amounting to approximately \$30,000,000 in the Adam Opel Co., of Russelsheim, Germany.

The Opel motor works are the largest manufacturers of automobiles in Germany and their distribution covers Europe and parts of Africa and Australia. General Motors executives were sent to assist with Opel production, and at the last General Motors stockholders' meeting, Fritz Von Opel was elected a director of General Motors.

With the formation of the Bendix Aviation Corp., April 13, it was announced that General Motors would have an approximate 25 per cent interest. Assets of The Delco Aviation Corp., a General Motors subsidiary, Electric Auto-Lite and other General Motors interests figured in the transaction, and the board of directors of the Bendix Aviation Corp. contains three General Motors executives.

May 17, General Motors announced that approximately 40 per cent of the stock of the Fokker Aircraft Corp. had been acquired, in exchange for the assets of the Dayton Wright Co., and a cash consideration of about \$6,500,000.

On May 24, 1929, General Motors announced the purchase "in its entirety" of the Allison Engineering Co., of Indianapolis, Ind. The Allison company was interested in the development of Diesel type engines for aviation use at the time of purchase, and it had recently been announced that the company would spend \$1,000,000 for new plants and material for the furthering of this work. It had been rumored about two months before that the General Motors was negotiating for the Treiber Diesel Engine Co., of Camden, N. J., a company similar to Allison, but no confirmation of the rumor was ever made. Purchase of the Allison Co. as soon after General Motors' entrance into the Fokker Aircraft Corp. is regarded as a tacit announcement by General Motors that a definite aviation program is under way, and will cover all phases of the industry.



Milton W. Anderson (left), president, United Tractor & Equipment Co., and Claire L. Barnes (right), president, Houdaille-Hershey Co.

In all, General Motors Corp. spent about \$70,000,000 during the year in cash and stock exchange for the acquisition of the plants enumerated above. Two new departures in the company policy were made, entrance into the aviation field and the international manufacturing field, and the operations of the corporation as a parts manufacturer were widened and strengthened.

Nearly \$200,000,000 in assets are represented in three mergers

which took place in the tractor and equipment field.

March 19, organization of the United Tractor and Equipment Corp. was announced, the 32 companies involved in the merger having combined assets of more than \$125,000,000, and including manufacturers, distributors, and a finance organization.

The United Tractor and Equipment Corp. is primarily an association for marketing purposes. The Allis-Chalmers Corp. is under contract to supply their complete production of tractors to the corporation, and these will be marketed under the name "United" through distributor members of the association. Other products manufactured by industrial members of the combination will be supplied under contract to the United Tractor and Equipment Corp. and marketed on the same basis. Financing will be handled through the Agricultural Bond and Credit Corp., which becomes a member of the combine.

Manufacturing members of the combine are: Allis-Chalmers Mfg. Co., Milwaukee, tractors; Wehr Co., Milwaukee, road building machinery and rubber-tired industrial wheels; Trackson Co., Milwaukee, logging hitches, full crawler attachments, cranes, bulldozers and backfillers; Brookville Locomotive Co., gasoline locomotives, Brookville, Pa.; Dorsey Bros., stump pullers and land clearing equipment, Elba, Ala.; Hughes Keenan Co., "Iron Mule" self-contained dump tractors, and Roderick Lean Mfg. Co., field type disk harrows, Mansfield, Ohio; C. H. Turner Mfg. Co., sawmill equipment and cordwood saws, Statesville, N. C.; Perry Co., scrapers, Perry, Ohio; Muskogee Iron Works, drum hoists and oil field equipment, Muskogee, Okla.; Brenneis Mfg. Co., orchard harrows, Los Angeles; Ferguson Mfg. Co., wheelless plows, Evansville, Ind.; Universal Power Shovel Co., power shovels, Detroit; Athens Plow Co., trailing and side disk plows, Athens, Tenn.; Moline Implement Co., general line of agricultural implements, Moline, Ill.

On May 21, it was announced by Milton W. Anderson, president of the United Tractor and Equipment Corp., that three new manufacturing members had been added to the organization since its inception. They are: Main

Steel Products Co., snow plows, Portland, Me.; T. S. Rowell Co., ensilage cutters and silo fillers, and the Northwestern Co., portable electric arc welding equipment, Milwaukee; thus bringing the number of units in the United Tractor and Equipment set-up to 35, of which 17 are distributors.

May 4, official confirmation of a merger between the Minneapolis Steel and Machinery Co., the Minneapolis Threshing Machine Co., and the Moline Implement Co., a member of the United combination, came with the formation of the Minneapolis-Moline Power Implement Co., in Delaware. The new corporation has an authorized capital of 100,000 shares of \$6.50 convertible cumulative preferred stock and 1,500,000 no par value common shares.

February 25, agreement was reached between three of the oldest farm implement manufacturing companies for the formation of the Oliver Farm Implement Co., a new \$50,000,000 organization. The Oliver Chilled Plow Works, South Bend, Ind.; the Nichols & Shepard Co., Battle Creek, Mich.; and the Hart-Parr Co., Charles City, Ind., were the three companies participating.

The Oliver Chilled Plow Works was founded in 1855 by James Oliver, the inventor and pioneer manufacturer of chilled plows. The Nichols & Shepard Co. was founded in 1848, and is the oldest incorporated company in Michigan. It was a pioneer in the manufacture of threshing machines. The Hart-Parr Co. was organized in 1901 and was the first concern to manufacture farm tractors.

Mergers of General Nature

Mergers of a general nature follow in the order of their appearance in the summary table attached.

In July, 1928, the Henney Motor Co. purchased control of the Weatherproof Body Corp., manufacturer of motor hearses, adding another activity to the diversified groups which were centralized in October under the name of Allied Motor Industries, Inc. The Great Lakes Aircraft Corp. control was purchased from Glenn L. Martin in October and Mr. Martin began forming his own company, which recently opened a new plant near Baltimore. In December, 1928, the properties of the original Henney Motor Co., of Freeport, Ill., were transferred to Henney Motor Co., of Del., a newly formed and wholly owned subsidiary. These properties constituted the physical assets of the Allied Motor Industries, Inc.

In December also, the Van Sicklen Corp. was formed in Delaware to acquire the business and assets of the Elgin Clock Co. All of the Class B common stock of the Van Sicklen Corp. is owned by Allied Motor Industries.

Subsidiaries of the latter are now engaged in the manufacture of funeral and hospital vehicles, commercial automobile bodies, aircraft, truck cabs, special wood and metal equipment for automobiles, water cooler and refrigerator cabinets, and washing machine parts. Plants are located in Freeport and Elgin, Ill.; Corunna, Mich., and Cleveland, Ohio. Assets of Allied Motor Industries, Inc., are listed at \$4,808,723.

On July 5, 1928, Manning, Maxwell and Moore, Inc., a holding corporation for a number of equipment plants including the Scurlock Gear Co., differential gears, bought the business of the American Schaffer and Budenberg Corp., reputed to be the largest manufacturer of valves and recording instruments in the world. Assets of Manning, Maxwell and Moore are listed as \$8,262,866, before the acquisition of American Schaffer and Budenberg.

Trindl Corp. of Aurora, Ill., purchased the Diamond Piston Ring Co., and added the Woodstock Motor Valve Co. to the list of their holdings in October.

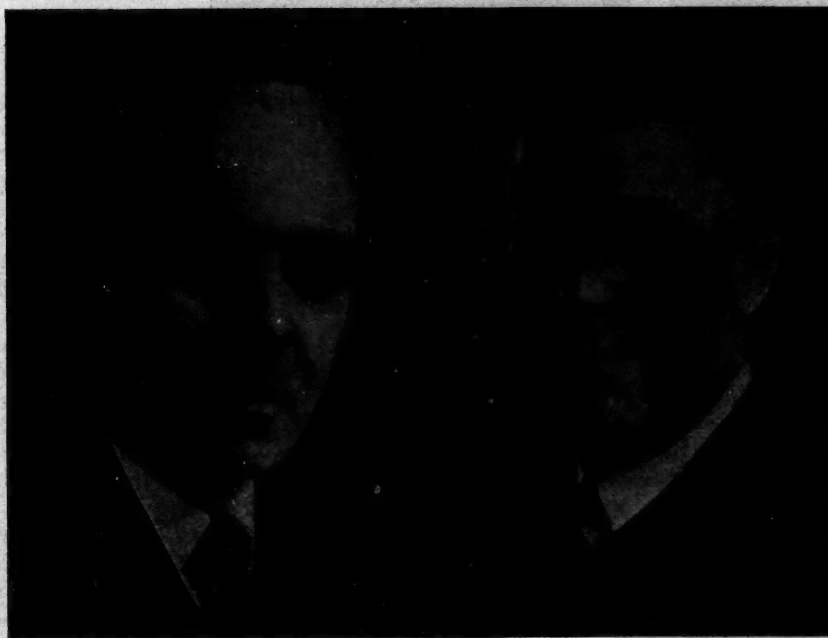
July 25, Diamond Motor Parts Co., St. Cloud, Minn., purchased the Security Muffler Corp. of Utica, N. Y. In April, 1929, Diamond Motor Parts was itself purchased by Aluminum Industries, Inc., of Cincinnati, makers of Permite pistons. The Diamond lines were continued under the trade name of Permite-Diamond.

August 11 it was reported from Indianapolis that the Gates Mfg. Co. and the Habig Mfg. Co. had merged as the Fabric Products Corp. Habig executives took over the management of the new company, and manufacturing activities were centered at the Gates plant. Products of the merged companies continue to be automobile fabrics and fabric accessories.

In August the merger of the Studebaker Corp. and the Pierce-Arrow Motor Car Co. took place. As a result of this merger two new subsidiary companies were formed. The export business of the two companies was united in the Studebaker Pierce-Arrow Export Corp., and the commercial car divisions of the two companies were also combined.

C. U. Williams and W. W. Williams, president and secretary, respectively, of the Williams Oil-O-Matic Heating Corp., bought control of the Mechanical Devices Co., of Aurora, Ill., Aug. 8. Assets of the Williams company were \$2,859,347 previous to the purchase. The Mechanical Devices Co. makes a pump which is used on oil burners.

August 28 it was announced that Landers Bros. Co., Toledo Auto Fabrics Co., and the American Buckram Weaving and Finishing Co., had combined as the Landers Corp. On Sept. 6, it was incorporated under the laws of Ohio with a capital of \$1,000,000.



H. H. Pease (left), president, New Britain-Gridley Machine Co., and C. B. Rose (right), president, La France-Republic Truck Co.

The Le Blond-Schacht Truck Co. of Cincinnati purchased the equipment and assets of the Armleder Truck Co. Sept. 13, 1928. A new corporation was formed and the Armleder equipment moved to the plant of Le Blond-Schacht. Property holdings of Armleder were not included in the purchase. The two companies were capitalized at \$700,000 and \$1,034,220 respectively.

Early in September stockholders of the North East Electric Co. approved a proposal to acquire the common stock of North East Service, Inc., the sales outlet of North East Electric. Simplification of operation of the parent company was given as the reason for the move. Common stock of North East Electric was issued to cover the cost of the purchase. Two shares of North East Electric stock were given for one share of the service company.

September 15, the Trailer Co. of America was organized in Cincinnati as a holding company and acquired an interest in the Trailmobile Co., of Cincinnati, and Lapeer Trailer Co., of Lapeer, Mich. Both of the companies continue to operate as separate organizations.

In September, 1928, the Wilcox-Rich Corp. was formed to take over the assets of the Wilcox Products Corp., and the Rich Products Corp. In January Wilcox-Rich Corp. was reincorporated to include the Rich Tool Co. Total assets of the merged companies now are \$5,789,956. Plants are located at Saginaw, Battle Creek, and Marshall, Mich., and one is leased at Detroit. Articles manufactured include valves, tappets, piston rings, forgings and special tools.

In October, 1928, the Allied Products Corp. was formed to acquire the business of the Indiana Lamp Corp., Richards Bros. Die Works and the Victor Peninsular Co. Offices were established at the Victor Peninsular headquarters in Detroit. Other plants of the corporation are located at Hinsdale, Mich., and Richmond, Ind. R. O. Cunningham, of Ford, Bacon & Davis, Inc., is president of the merged companies, which manufacture automobile lamps, caps, die screws, etc. The new corporation was formed under the laws of Illinois and has total assets of \$5,114,814.

Bendix Corp. purchased the majority interest in the Eclipse Machine Co., of Elmira, N. Y., in October, 1928. The minority interest was purchased by Electric Auto-Lite Co. at the same time. The Eclipse Machine Co. had been making Eclipse-Bendix starters for a number of years previous to the purchase. Earnings of the company for the year were reported to reach \$3,000,000.

The merger of the Black & Decker Mfg. Co. and the Domestic Electric Co. was completed Jan. 19 after negotiations in October. This merger is of particular interest because it was financed in a large part by sales of no par value common stock to employees of the Black & Decker Co., the cash so raised being used to pay 50 per cent of the purchase price of \$2,000,000 for the Domestic Electric Co. The Domestic Electric Co. manufactured fractional horsepower electric motors. About \$8,000,000 in assets were consolidated by the transaction. The Black & Decker Co. is located at Towson,

Md., and the Domestic Electric Co. in Cleveland, Ohio.

The General Foundry & Machine Co., incorporated in October, 1928, acquired the Flint Foundry Co., General Foundries and the Flint Malleable Casting Co. Combined assets are \$732,255. President is J. M. Baringer, New Britain-Gridley Machine Co.

Oct. 27, 1928, the Grant Storage Battery Co. of Milwaukee acquired the Empire Electric Mfg. Co., Beaver Dam, Wis. The business was continued as the Empire Battery Co., a distinct division of the Grant organization, and work at the Empire plant allowed to go on.

The Hershey Corp. was formed by the merger of the Hershey Mfg. Co. and the Kelvinator Corp. in October. In January, 1929, the Houdaille-Hershey Corp. was formed to take over the Hershey Corp., the Houdaille Corp. and the Oakes Products Corp. Assets of \$5,856,936 were consolidated by the merger, and C. L. Barnes became president of the new corporation. In November, 1928, the New York Car Wheel Co. had acquired an interest in the Houde Engineering Co., a subsidiary of Houdaille-Hershey. Plants of the

Houdaille-Hershey Corp. are located at Buffalo, Indianapolis, Chicago and Detroit.

In October, 1928, the Keystone Aircraft Corp., Bristol, Pa., merged the Loening Aeronautical Engineering Corp. by an exchange of stock. Assets of Keystone Corp. after the merger were listed as \$1,543,052.

The Autopulse Corp. was formed in November to manufacture an electric automatic fuel pump. The company acquired good will and machinery of Ireland & Matthews of Detroit. Capital of the Autopulse Corp. is listed at \$200,000.

The Muskegon Motor Specialties Co. was incorporated in Delaware in November, 1928, to acquire the business and assets of the Muskegon Motor Specialties Co., a Michigan corporation, and the L. O. Gordon Mfg. Co. Plants of both companies are in Muskegon and specialize in the manufacture of camshafts for all types of engines. Assets of the combined companies are placed at \$1,400,706.

The purchase by the Hupp Motor Car Corp. of the Chandler-Cleveland Motors Corp. also came in November, 1928. The story of this merger was given at length in *Automotive Industries* for Dec. 22, 1928.

In December, 1928, the Curtiss Aeroplane & Motor Co., Inc., acquired the assets of the Reid Aircraft Co., Ltd., adding to the list of companies grouped about C. M. Keys, chairman of the board of Curtiss.

In the same month the Electric Auto-Lite Co. acquired control of the Columbus Auto Parts Co., through the ownership of a majority of the 100,000 shares of no par common stock outstanding. The Columbus plant manufactures steering rods and drag links. Its assets are listed as \$1,304,223.

General Aero Corp. of America was formed in December, 1928, to acquire aeroplane and transport companies. It entered the manufacturing field through purchase of control of the Swallow Airplane Co., of Wichita, Kan.

Hahn Motor Truck Corp. of Allentown, Pa., and Selden Truck Corp., Rochester, N. Y., merged as of Dec. 20, 1928. Under the plan of merger manufacture of the two



Vincent Bendix, president, Bendix Aviation Corp.

lines of trucks in the separate plants with manufacture of bodies for both concentrated in the Hahn plant at Allentown. In 1926 the Hahn business, outgrowth of an old carriage and wagon factory, was merged with Bethlehem Motors Corp., of New York, and the Lehigh Co., of Allentown, as Hahn Motor Truck Corp. Assets of the new capitalization are not available. The Selden Truck Corp. was capitalized at \$500,000.

The Liberty Foundry Co., operators of the Spring City Foundry Co., Waukesha, Wis., purchased the McNally-Tollefson Foundry Co., of Stoughton, Wis., as of Nov. 28. E. M. Tollefson and R. I. Tollefson retired from the company, while J. E. McNally retained an interest and continued as manager of the plant. All three of the Liberty companies specialize in the production of internal combustion engine cylinder castings, pistons, etc.

Also in December, North American Aviation, Inc., bought heavy holdings in the Sperry Gyroscope Co., in which National Aviation Corp. owns a large interest.

Negotiations were completed in December by which the Atlas Manufacturing Co. acquired the Ansonia Novelty Co., the two companies to operate as the Atlas-Ansonia Co. The Atlas Manufacturing Co. was a subsidiary of Chandler-Cleveland Motors Corp., manufacturing crankshafts. The Ansonia Co. manufactured metal specialties. Plants are at New Haven and Ansonia, Conn.

In January, 1929, the Auburn Automobile Co. acquired the Central Manufacturing Co., which had been making automobile bodies for them under contract. The purchase raised the number of Auburn plants at Connersville, Ind., to two.

Jan. 5 the Borg-Warner Corp. acquired the Long Manufacturing Co., manufacturer of automotive clutches, and Jan. 17 the Johnson Co. was purchased. Merger with the Galesburg Coulter-Disc Co. was effected by a share for share exchange of stock during the month, and practically all the common stock of Galesburg came into Borg-Warner possession. Assets of the Galesburg Coulter-Disc Co. were reported as \$2,750,524.

April 23 Borg-Warner acquired plants of the Morse Chain Co. at Ithaca and Detroit, Morse Chain Co., Ltd., England, and properties of the Ithaca Street Railways Co. in the shape of water rights. Aircraft, adding machine, typewriter and electric clock divisions of Morse Chain were not included in the purchase. Assets of the Morse Chain Co. totaled \$8,122,127. Amount transferred by the purchase is not available.

The Continental-Diamond Fibre Co. was incorporated in Delaware in January, 1929, to effect the merger of the Continental Fibre Co., Newark, Del., and the Diamond State Fibre Co., Bridgeport, Pa. Celoron Co., makers of fibre timing gears, are a subsidiary of Diamond State. Assets of the Continental-Diamond Fibre Co. are \$7,458,893. Besides the Newark and Bridgeport plants the company operates branch factories in Chicago and Toronto and plants in England and France.

In January the Spicer Manufacturing Corp. acquired all the outstanding capital stock of the Brown-Lipe Gear Co., of Syracuse, N. Y. Three-dollar preferred cumulative stock to the amount of 100,000 shares was

issued by Spicer to take care of the acquired assets.

January 5 the Spray Engineering Co. and the Spraco Painting Equipment Co. were merged as Spraco, Inc.

January 22 stockholders of the Wisconsin Parts Co. ratified the sale of the company to the Timken-Detroit Axle Co. through the exchange of stock on a basis of $2\frac{1}{4}$ shares of Timken common for one share of Wisconsin. Merger plans called for the issue of 157,000 shares of \$10 par value common by Timken in payment for Wisconsin assets. The Wisconsin Parts Co. was dissolved and the Wisconsin Axle Co. organized as a Timken subsidiary. The new company had a capital of 10,000 shares of no par common stock. All of it came into Timken possession except directors' qualifying shares. Assets of the Wisconsin Parts Co. were \$1,101,239 and of the Timken-Detroit Axle Co., \$16,777,864.

In February, Barnes-Gibson-Raymond, Inc., spring manufacturer, announced the acquisition of the Cook Spring Co., Ann Arbor, Mich. A. J. Donally, president of Cook Spring, retired from active connection with the company, which will be operated as Cook Spring Division of Barnes-Gibson-Raymond.

Feb. 13, 1929, it was announced that Parks Air Craft, Inc., a subsidiary of Gardner Motor Co., had an authorized capital of 210,000 shares of \$10 par capital stock, of which 25,000 shares were outstanding. Gardner Motor Co. held 20,000 shares or 80 per cent of outstanding stock.

In February the General Spring Bumper Corp. was formed in Delaware to replace the C. G. Spring & Bumper Corp., which was the result of several earlier mergers. By March about 80 per cent of the common stock of the Biflex Products Corp. was obtained. The assets of the combined companies are listed as \$3,882,679. The Biflex Products Corp. continues to be operated as a separate unit.

The Cleveland Piston and Ring Co. and the Cox Tool Co. were acquired by Thompson Products, Inc., of Cleveland, by an arrangement with the stockholders of the two

companies. Assets of Thompson Products previous to the merger were listed as \$6,389,212.

The Warchel Corp. was incorporated in Illinois to acquire all the stock of Ward-Love Pump Corp., J. H. Channon Corp. and the Elite Manufacturing Co. Plants are located at Rockford, Ill., and Ashland, Ohio. Besides making a line of industrial equipment the company manufactures garage and service station heavy equipment. Assets following the merger were listed at \$1,632,262.

Thermoid Co. was incorporated in January, 1929, as the successor to a business founded in 1897 which grew to be one of the largest manufacturers of brake lining in the world. Properties of the Stokes Asbestos Co. were acquired following the reorganization. Assets of Thermoid Co. are listed at \$5,068,527.

Stockholders of the Nachman-Springfield Corp. approved the merger of the Spring Co. formed to acquire all the capital stock of the Kay Manufacturing Co., of Brooklyn, with the Nachman Co. The merger was effected through issuance of 84,000 shares of Nachman capital stock in exchange for 100,000 shares of stock in the Spring Co.



Anthony H. G. Fokker, of the
Fokker Aircraft Corp.

With this merger the Spring Co. disappeared, leaving the Nachman-Springfield Corp. owner of all stock in the Kay Manufacturing Co. The formation of a third organization was necessary to comply with the Illinois laws, which do not permit a corporation of that state to merge with a foreign corporation.

March 8 the machine tool business of the New Britain Machine Co. was consolidated with the Gridley Machine Co., of Hartford, under the name of the New Britain-Gridley Machine Co. H. H. Pease, of the New Britain Machine Co., became president of merged organizations.

H. J. Hayes Industries, Inc., was formed in Michigan in April to take over the Hayes Products Co. and the Victor Body Corp. The authorized capitalization of the new company included 500,000 shares of class A preferred stock and 1,000,000 shares of no par class B stock. H. J. Hayes is reported to have invested \$450,000 cash in the two companies and to have taken stock in the new company in exchange for his holdings.

April 25, 1929, stockholders of the Kelsey-Hayes Wheel Corp. and the Wire Wheel Corp. of America approved consolidation into a new company to be known as Kelsey-Hayes Wheel Corp. Exchange of stock was the basis of the merger. Assets of Kelsey-Hayes were listed \$30,319,339 in a balance statement following the merger. Preferred and common stockholders of Kelsey-Hayes exchanged their stock, preferred and common, on a share for share basis, for stock in the new corporation. Holders of preferred stock in Wire Wheel Corp. received one share of 7 per cent preferred in the new company. Holders of class A stock in Wire Wheel received five-sevenths of a share of 7 per cent preferred stock in the new company for each share held. Common stockholders of Wire Wheel received 0.58 shares of common stock in the new corporation.

On May 15, 1929, stockholders of the Republic Motor Truck Co., approved the merging of the company with the commercial car division of the American-La France & Foamite Corp., in a new company to be known as the La France-Republic Co. Charles B. Rose, president of the American-La France Co., heads the new organization. The Republic Co. received \$909,500 in preferred stock of the new company for its assets, and in addition the new company assumed \$1,150,000 in outstanding debentures of the Republic Motor Truck Co. American-La France assets are secured by \$1,514,400 of preferred stock in the new corporation. Preferred stockholders in Republic received preferred stock in the new corporation on a share for share basis. Assets of the combined companies approximate \$2,000,000.

Moto Meter Gauge & Equipment Co. was incorporated in Delaware to acquire the business and assets of Moto Meter, Inc., and Saf-T-Stat Co. The New York Curb Market admitted to trading privileges 512,500 of the company's no par common shares.

The Walker Manufacturing Co. and the Ajax Auto Parts Co., both of Racine, Wis., announced May 9 that a contract has been signed covering the merger of the two companies, which were expected to be operated as separate units with no drastic changes in personnel or output.

June 4 it was announced that the Kearney & Trecker Corp., Milwaukee, manufacturer of milling machines for metal working, had purchased the plant of the Gerlinger Steel Casting Co., also of Milwaukee. Facilities of the Gerlinger plant would be used for expansion of Kearney-Trecker production.

Kingsley-Miller Co., maker of radiator caps, heat indicators and other automobile specialties, was sold to Martin E. Goldman and associates, it was announced by Howard F. Kingsley, retiring president of the company, June 3. Expansion of Kingsley-Miller activities is contemplated by the new owners.

The Rockford Union Foundry Co. was merged with the Sundstrand Machine Tool Co., under the latter name, June 4. Hugh L. Olson became the president and general manager of the combined firms, which will continue to operate as heretofore.

During June it was announced that a block of 40 per cent of the capital stock of the new German Ford Motor Co. had been assigned to the German Die Trust (Interessen Gesellschaft), and that Dr. Carl Bosch, president of the die trust, would become chairman of the board of the German Ford Motor Co.

Mergers in the automotive equipment distribution field have not been great in number during the past year, but the two large ones were recorded.

The Chanslor & Lyon Co., automotive equipment wholesaler of San Francisco, reincorporated in January as Chanslor & Lyon Stores, Inc., and purchased the business of the McCoy Motor Supply Co., San Francisco, and the California Auto Supply Co., Stockton, Cal. The business of the James S. Remick Co., Sacramento, was purchased as of April 1.

During March the Consolidated Motor Parts, Inc., was formed in Brooklyn, N. Y., by the merger of four of the leading parts and accessory houses in the borough. The companies included were: H. H. Rudnick Co., Inc., Howell Trieber Co., Miller-Larramee Co. and Holland & Degandhardt.

Combinations of Automotive Corporate Interests

NEW CORPORATION OR BUYER	OTHER CONCERNS INVOLVED	NEW CORPORATION OR BUYER	OTHER CONCERNS INVOLVED
July, 1928		September, 1928	
Henney Motor Co.	Weatherproof Body Corp.	Landers Corp.	Landers Bros. Co.
Manning, Maxwell & Moore, Inc.	American Schaeffer & Bud- enberg Corp.		Toledo Auto Fabrics Co.
Motor & Equipment Assn.	Automotive Equipment Assn.	LeBlond-Schacht Truck Co.	American Buckram Weav- ing & Finishing Co.
	Motor & Accessory Mfrs. Assn.	North East Electric Co.	O. Armleder Motor Truck Co.
Trindl Corp.	Diamond Piston Ring Co.	Trailer Co. of America	North East Service, Inc.
August, 1928		Wilcox-Rich Corp.	Trailmobile Co.
Diamond Motor Parts Co.	Security Muffler Corp.		Lapeer Trailer Corp.
Fabric Products Corp.	Gates Mfg. Co.		Wilcox Products Corp.
	Habig Mfg. Co.		Rich Products Corp.
October, 1928			
Studebaker Corp. of Am.	Pierce-Arrow Motor Car Co.	October, 1928	
Williams Oil-O-Matic Heat- ing Corp.	Mechanical Device Co.	Allied Motor Industries, Inc.	Henney Motor Co., etc.
		Allied Products Corp.	Indiana Lamp Corp.
			Victor-Peninsular Co.
			Richards Bros. Die Works

NEW CORPORATION OR BUYER	OTHER CONCERNS INVOLVED	NEW CORPORATION OR BUYER	OTHER CONCERNS INVOLVED
October, 1928 (cont.) Bendix Corp. Black & Decker Mfg. Co. Electric Auto-Lite Co.	Eclipse Machine Co. Domestic Electric Co. Eclipse Machine Co. (minority)	February, 1929 (cont.) Thompson Products, Inc.	Cleveland Piston & Mfg. Co. Cox Tool Co. Elite Mfg. Co. Ward-Love Pump Corp. J. H. Channon Corp.
General Foundry & Machine Co.	Flint Foundries Co. General Foundries Flint Malleable Casting Co. Guide Motor Lamp Co. Empire Electric Mfg. Co. Hershey Mfg. Co. Kelvinator Corp. Loening Aeronautic Engineering Corp.	Warchel Corp.	
General Motors Corp. Grant Storage Battery Co. Hershey Corp.		March, 1929 Aviation Corp.	Incorporated to hold aviation stocks
Keystone Aircraft Corp.		Consolidated Motor Parts Co.	H. H. Rudnick Co., Inc. Howell Trieber Co. Miller Larramee Co. Holland & Deganhardt Opel Motor Works Nachman Co. Kay Mfg. Co.
November, 1928 Autopulse Corp.	Ireland and Matthews Mfg. Co. Elgin Clock Co. Chandler-Cleveland Motors Corp.	General Motors Corp. Nachman Springfilled Corp.	New Britain Machine Co. Gridley Machine Co.
Henney Motor Co. Hupp Motor Car Corp.	L. O. Gordon Mfg. Co. Muskegon Motor Spec. Co. Houde Engineering Co.	New Britain-Gridley Machine Co.	32 units, see page 902 for details
Muskegon Motor Specialties Co.		United Tractor & Equipment Corp.	
New York Car Wheel Co.			
December, 1928 Atlas Ansonia Co.	Atlas Mfg. Co. Ansonia Novelty Co.	April, 1929 Aluminum Industries, Inc. Bendix Aviation Corp.	Diamond Motor Parts Co. Bendix Corp. Stromberg Carburetor Corp. of America Scintilla Magneto Co. Delco Aviation Corp., etc. B. W. Morse Chain Co. McKinnon Industries, Ltd. Hayes Products Co. Victor Body Corp.
Curtiss Aeroplane & Motor Co., Inc.	Reid Aircraft Co., Ltd.	Borg-Warner Corp. General Motors Corp. H. J. Hayes Industries	Wire Wheel Corp of America
Electric Auto-Lite Co.	Columbus Auto Parts Co.	Kelsey-Hayes Wheel Corp.	Minneapolis-Moline Power Implement Co.
General Aero Corp. of Am.	Swallow Airplane Co.	Minneapolis-Moline Power Implement Co.	Minneapolis Threshing Machine Co. Moline Implement Co. Minneapolis Steel & Machinery Co.
Hahn Motor Truck Corp. Liberty Foundry Co.	Selden Truck Corp. McNally-Tollefson Co. Spring City Foundry Co.		
North American Aviation, Inc.	Sperry Gyroscope Co.		
United Aircraft & Transport Corp.	Boeing Airplane and Transport Corp. Pratt & Whitney Aircraft Corp. Chance Vought Corp. Rich Tool Co.		
Wilcox-Rich Corp.		May, 1929 Bendix Aviation Corp.	Cowdrey Brake Tester Organization, Inc. Menominee Motor Truck Co. of Wis. Fokker Aircraft Corp. Allison Engineering Co. Republic Motor Truck Co., and Commercial Car Div. of American-LaFrance & Foamite Corp.
January, 1929 Auburn Automobile Co. Borg-Warner Corp. Borg-Warner Corp. Borg-Warner Corp. Chanslor & Lyon Stores, Inc.	Central Mfg. Co. Long Mfg. Co. Galesburg-Coulter Disc Co. Johnson Co.	Four Wheel Drive Auto Co.	Moto Meter Gauge & Equipment Co.
Continental-Diamond Fibre Co.	Chanslor & Lyon Co. McCoy Motor Supply Co. California Auto Supply Co.	General Motors Corp. General Motors Corp. LaFrance-Republic Corp.	Porterfield Aviation Interest, Inc.
Houdaille-Hershey Corp.	Diamond State Fibre Co. Continental Fibre Co. Houdaille Corp. Hershey Corp. Oakes Products Corp. Brown-Lipe Gear Co. Spray Engineering Co. Spraco Painting Equipment Co.	Moto Meter Gauge & Equipment Co.	Walker Mfg. Co.
Spicer Mfg. Corp. Spraco, Inc.	Wisconsin Parts Co. Woodstock Motor Valve Co.	Porterfield Aviation Interest, Inc.	
Timken-Detroit Axle Co. Trindl Corp.		Walker Mfg. Co.	
February, 1929 Barnes-Gibson-Raymond, Inc. Gardner Motor Co. General Spring Bumper Corp.	Cook Spring Co. Parks Aircraft, Inc.	June, 1929 Comet Engine Corp.	Gisholt Machine Tool Co., et al. Nine companies, see page 920. German Die Trust Gerlinger Steel Casting Co. Bought by Martin E. Goldman, et al. Heywood Starter Corp. Simon Airplane Appliance Co. Rockford Union Foundry Co. Sundstrand Machine Tool Co.
Oliver Farm Equipment Co.	C. G. Spring & Bumper Co. Biflex Products Co. Oliver Chilled Plow Works Nichols & Shepard Co. Hart-Parr Co. Thermoid Rubber Co. Stokes Asbestos Co.	Sky Specialties Corp.	
Thermoid Co.		Sundstrand Machine Tool Co.	

Willard Battery Assembly

Expedited By Means of

Its Conveyor System

Use of both gravity and power carrier units reduces handling of monoblocs to a minimum



Four stages of the continuous conveyor used to assemble Willard batteries. Above is Fig. 1, and to the right, Fig. 2, referred to in the accompanying article



THE job of unloading about five carloads daily of monobloc battery cases and transporting them to the assembly line is handled very efficiently in the plant of the Willard Storage Battery Co., of Cleveland, by means of conveyors.

As shown in Fig. 1, a conveyor from the interior of the building comes out to the unloading platform. It is connected up with the freight cars to be unloaded by portable gravity conveyors which are inserted inside the cars so that no carrying of cases is required.

When placed on the gravity conveyors, the cases are carried down to the power conveyor and are lifted by it and carried into the building, as shown in Fig. 2, where the conveyor from the unloading platform is seen in the left background. While passing through the "Finishing Room," shown in Fig. 2, the monoblocs are taken off the conveyor by a small crew of girls and are given an electrical test consisting of a 30,000 volt shock, a visible inspection and then have the Willard medallion

painted on them. Most of the cases are then placed in the stockroom by means of the belt conveyor shown in the right foreground to await orders for assembly.

In removing blocks from the stockroom, power belt-conveyors are employed again to bring cases directly from storage to the transport conveyor, which carries them through several buildings to the assembly line. A portion of this conveyor passing over an alleyway between two buildings is shown in Fig. 3. It is covered to protect the monoblocs while passing through the open.

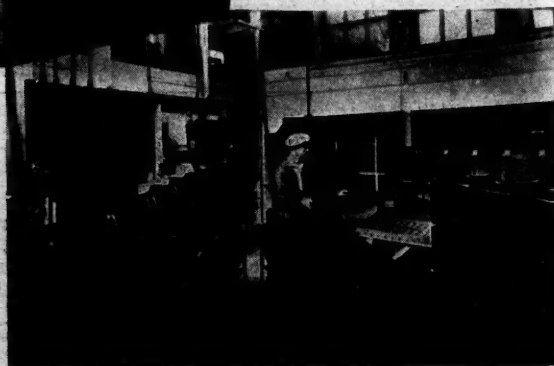
The end of this conveyor is shown in Fig. 4, where the cars arrive on the conveyor at the rear and are placed by a gang of men on the proper unit of the multiple conveyors, shown arranged in a fan shape, which take the cases down directly to the place in the assembly line where they are to be used.

The total distance traversed by the cases from the freight cars to the final assembly line is slightly more than 900 ft. If the case runs straight through, the conveyor speeds are such that about 18 min. is required for the journey.



Above—
Fig. 3

Right—
Fig. 4



Machine Tool Depreciation Survey Shows Rating Inconsistencies

Of 30 different types of equipment used by representative plants, only ten are given an average useful life of less than ten years.

By K. W. STILLMAN

DESPITE the extensive discussions which have been given to the subject of depreciation during recent years, particularly for the purpose of demonstrating the advantages of setting depreciation rates high enough to write off assets, at least within the term of their actual life, it appears that there is still considerable room for improvement in the usages employed in automotive plants.

This is borne out by a survey recently completed by *Automotive Industries* which obtained depreciation data on various types of machine tools from a number of representative automotive plants. The composite picture of the situation as shown by this survey is given in an accompanying table. Of 30 different types of machine tools covered in the survey, only 10 are given an average useful life of less than 10 years. It is doubtful if this is a fair representation of the actual average useful life of such equipment in modern automotive shops.

Information, gathered from inspection of plants and from talks with production men, leads one to believe that a 10-year-old machine tool in a modern production line is somewhat of an unusual occurrence, and not the common thing, as indicated by these depreciation rates.

Of course, there are a number of factors entering into the setting of depreciation rates but, in the last analysis, the aim of every such determination is to set that rate which will, within the closest possible limits, just write off the value of the asset by the time it becomes no longer fit for use, whether through physical deterioration, obsolescence or for some other reason.

Since to make such a determination, a forecast of the future is necessary, no certain solution can be had for the problem, and a number of influencing factors are likely to have considerable weight. The influence of the production department is sometimes divided between a desire to fix rates high, in order to facilitate the replacement of old and obsolete machine tools with new equipment, and the opposite tendency, to keep its immediate

operating costs as low as possible, which brings its influence to bear on the side of relatively low rates.

From the viewpoint of the general management, there are again two conflicting viewpoints which must be reconciled in establishing depreciation practice. The management wants to make as good a record as possible and to show the greatest profits on each year's operations. To aid this purpose, depreciation should be written off slowly. But, on the other hand, profits are taxed rather heavily by the government so that high depreciation rates keep money in the company coffers which might otherwise have to be paid in taxes.

While it is generally frowned upon by conservative industrialists and bankers, it must be admitted that not infrequently depreciation rates and reserves are utilized in bolstering up book values of some concerns. Heavy write-offs in good years are offset by no additions to reserves during poor years, thus giving the company a fictitious picture of profitable operation.

Despite these divergent influences which may affect depreciation practice, it appears to be the belief in most modern, well-managed concerns that depreciating assets according to actual facts is the best method in the long run. Over a period of time, equipment wears out, becomes obsolete and must be replaced. There is no escaping that fact. Therefore, to acknowledge it at once and to determine depreciation rates on the basis of what will actually happen, as closely as it may be determined in advance, has been considered to be the most economical and business-like way of handling the problem.

In the particular operation of the theory, however, and with especial regard to machine tools, there appears to be some difficulty in arranging depreciation rates in accordance with actual knowledge of the average useful life of machine tools. For example, the survey brings out the point that there appears to be room for con-

siderably greater coordination between sales policies in buying new tools and depreciation rates.

It is well-known that many concerns demand that proposed new

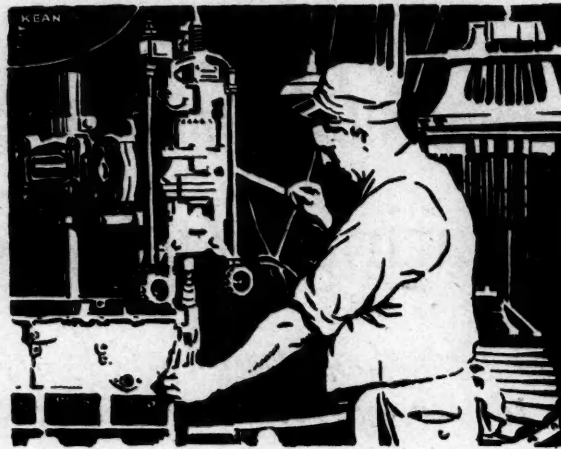


machine tools shall pay for themselves in productive savings in a relatively short period of time—two years being, possibly, an average figure for the industry. To so limit purchases of new tools and then, when they are in operation, to depreciate them on the basis of a useful life of 10 years or more appears to be a bit inconsistent, to say the least, and certainly is not conducive to facilitating the replacement of obsolete equipment with modern types.

Another rather interesting fact brought out by the survey, as shown in the table, is the lack of uniformity among the concerns contributing to the survey as to how long any particular type of tool should last. Of course, there are differences in the operations for which tools are used, just as maintenance methods and other influential factors vary among plants; still, these items do not seem to justify the very wide differences in estimated useful life indicated in the table.

Here we find the estimated life of boring and turning machines ranging from seven to 22 years, drilling machines from eight to 25 years, milling machines with the same range, broaching machines ranging from six to 20 years, and so on. From the evidence given here, it is justifiable to question just how much actual study has been made of conditions affecting machine tool life in setting depreciation rates. One gets the idea, somehow, that many of these useful life figures have been carried over from previous years and that there probably was an absence of exact information in their original determination.

This opinion is supported to a considerable extent by the data in the third column of the table which shows the "mode" or the most frequently used length of life. The fact that 16 of the 30 types of tools listed are given an estimated length of life of 10 years more frequently than any other period may have some special signifi-



cance. Is it likely that 10 years happens to be the average life of such widely different pieces of equipment as punch presses and cylindrical grinders, for instance, in a majority of the plants surveyed? Or is it more likely that 10 years has been chosen mainly because it provides a most convenient period for calculating depreciation rates?

Are production executives still making it hard for themselves to purchase new tools in replacement of old and worn-out equipment, be-

cause they have not insisted on depreciation rates adequate to write off the value of old tools during their actual useful life?

The evidence obtained in the survey does not permit any answer to these questions but they are justifiably raised after examining the returns.

Even taking the lower limit of the life ranges given in the table, questions might be raised as to the adequacy of the depreciation practice based upon them. The shortest life given to standard boring, drilling, milling and grinding machines is eight years. While this is probably adequate for modern equipment, properly maintained, in so far as physical deterioration goes, does it adequately care for the factor of obsolescence?

How many production men can point to machines of this type which have been operated in their own shop over eight years which could not be replaced today by more modern machines with economy? There undoubtedly are many, in actual numbers, which are still handling their particular job satisfactorily but, from what one learns from factory men, a relatively large proportion of machines eight or more years old are obsolete and could be replaced to the economic advantage of the user.

So long as no special method for insuring against losses through obsolescence is employed, this factor
(Please turn to page 916)

MACHINE TOOL DEPRECIATION TABLE

Tool	Average Life Years	Range of Life Years	Most Popular Life Years	Tool	Average Life Years	Range of Life Years	Most Popular Life Years
Boring and Turning Machines	11.9	7-22	12	Gear Cutting Machines	10.1	5-15	10
Horizontal	9.5	7-15	12	Hobbers	10.5	6-20	10
Special Purpose	7.6	3-15	8	Shapers	10.8	5-25	10
Drilling Machines	12.4	8-25	10	Worm Millers	10.4	6-20	9
Upright and Horizontal	10.5	8-15	10	Lathes	10.6	8-15	10
Special Purpose	8.0	4-15	7	Engine	13.2	10-25	10
Milling Machines	12.6	8-25	10	Turret	11.5	6-25	10
Manufacturing	9.2	8-12	11	Special Purpose	7.6	4-14	8
Knee	10.6	8-15	10	Planers and Shapers	14.5	10-25	12
Special Purpose	7.6	3-15	8	Presses	11.3	9-15	11
Grinding Machines	9.3	8-11	9	Punch	11.8	9-20	10
Surface	11.0	8-20	10	Coining	9.7	6-12	10
Cylindrical	10.5	8-20	10	Punching and Shearing Machines	13.0	10-20	10
Special Purpose	8.6	4-15	8	Threading Machines	11.7	8-25	9
Broaching Machines	11.5	6-20	10	Welding Machines	9.7	6-15	7
				Number of hours—operated weekly	50.6	47-55	50

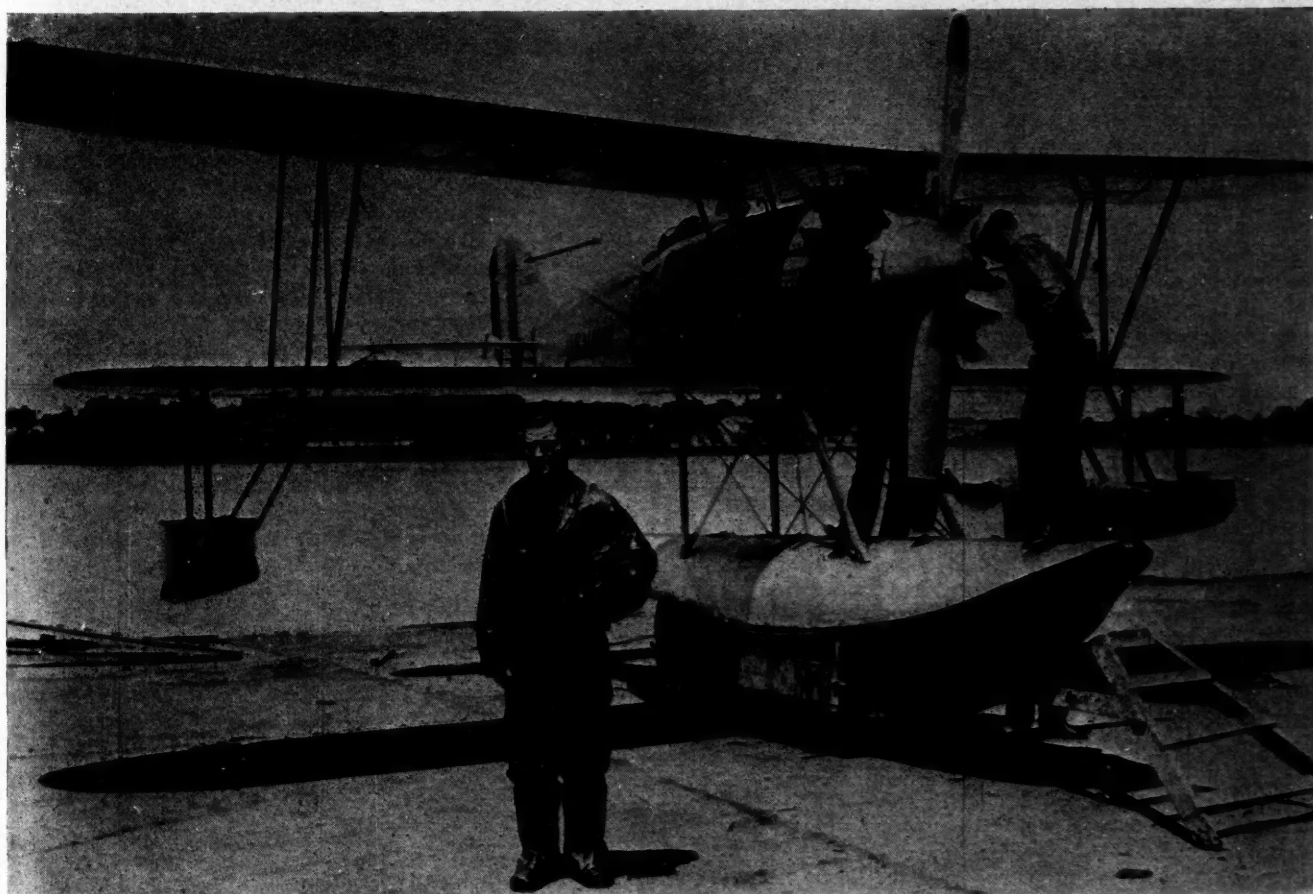
Roots Supercharger on Soucek Plane Proves Efficiency of Blower Type

Originally designed for industrial purposes, the unit was developed for aircraft engine use by the National Advisory Committee for Aeronautics.

THE plane with which Lieutenant Apollo Soucek of the U. S. Navy recently broke the altitude record was equipped with a Roots blower type of supercharger, as developed by the National Advisory Committee for Aeronautics. Its performance would seem to prove the efficiency of this type for altitude flying. While Roots blower type superchargers have been used to quite an extent on automobile engines, especially by Mercedes, in aircraft work the centrifugal type of supercharger has been used almost exclusively so far. But the N. A. C. A. some years ago set out to develop a blower type of supercharger and produced a design which has been tested extensively in the lab-

oratory and in flights, and now has shown its capabilities in a most striking way.

The Roots blower for industrial uses is a commercial product. That considerable work has to be done to adapt it for supercharging purposes on aircraft engines may be judged from the fact that the industrial blower of the same displacement as the one developed by the N. A. C. A. runs at 500 r.p.m., while the normal speed of the aircraft supercharger is 2550 r.p.m. For aircraft work the supercharger naturally must be built as light as possible, consistent with strength requirements, and most of the parts of the N. A. C. A. are made of light alloys and alloy steels, the light alloys



Lieutenant Apollo Soucek, and the Wright seaplane, equipped with a Wasp engine and Roots supercharger, with which he recently established an altitude record of 38,560 ft. The plane is the same with the exception of the pontoons, with which he reached an altitude of 39,140 ft. on May 8, a record which was almost immediately surpassed by Willi Neunhufen, of Germany, in a Junkers plane



Fig. 1—N. A. C. A. Roots type supercharger with Liberty 12 engine. Lieutenant Soucek used a Wasp engine in his record flight

being used in the form of castings throughout the unit.

The supercharger weighs 88 lb. and is operated from the rear of the engine at one and one-half times crankshaft speed. Its rotors are cycloidal in form, $9\frac{1}{2}$ in. in diameter and 11 in. long. The displacement is 0.51 cu. ft. of air per revolution of the rotors.

The relative speed of one and one-half times crankshaft speed was selected because it was thought that there was a possibility of a gain in supercharging due to synchronization of the pulsations of the air delivery and of the induction strokes of the engine. The supercharger was built to fit the Liberty 12-cylinder aircraft engine, in which there are six inductions per revolution. With the Roots blower there are two periods of delivery per revolution of each blower rotor, resulting in four pressure impulses per revolution of the two rotors. Therefore, in order that the frequencies of the pulsations produced by the supercharger and the engine may be equal, the supercharger rotor speed must be one and one-half times engine speed. The induction strokes of the Liberty 12-cylinder engine are not evenly spaced, however, since its two banks of cylinders make an angle of 45 deg. with each other and explosions come alternately at intervals of 45 deg. and 75 deg.

While the supercharger was originally designed to be mounted directly on the rear of the Liberty engine and to be supported entirely by it, it was found preferable to mount it on the extended engine bearers and drive it through a flexible coupling, as this reduced the liability of damage due to misalignment.

The housing is made of aluminum castings, substantially ribbed, and a steel plate separates the rotor compartment from the gear compartment. The rotors, which are shown in Fig. 2, are hollow castings and have a wall thickness of about $\frac{3}{16}$ in. They are $9\frac{1}{2}$ in. in diameter by 11 in. long, the contour being cycloidal, except for the small ridge at the tip, which is concentric with the axis, and a narrow flat portion near the hub. Shallow clearance grooves are cut at the junctions of those surfaces with the cycloidal surfaces. The rotors are fitted with rectangular steel driving flanges which fit into machined recesses in the ends and are fastened by machine screws. The driving flanges have internally splined hubs which fit on splines on the rotor shaft.

Originally the rotors were made of ordinary cast aluminum, but these were later replaced with rotors made of another aluminum alloy of higher tensile strength and slightly higher specific gravity. Drive of the rotors is effected by means of a gear running at crankshaft speed, which meshes with another gear

forming an integral part of one of the rotor shafts, the ratio of these gears determining the rotor speed relative to engine crankshaft speed. The two rotor shafts are connected by another pair of gears which serve to maintain the proper relation between the two rotors, as well as to transmit power from one rotor shaft to the other.

In the original design, contact between the ends of the rotors and the housing was limited to a narrow ring near the shaft by a slight projection on the rotor ends formed on the flanged hubs, but in tests of the supercharger all contact between rotors and housing was prevented by inserting distance pieces between the ends of the outer races of the rotor shaft ball bearings and the bearing cover plates. It was originally intended to lubricate the blower from the pressure oiling system of the engine, but in the tests it was found to be preferable to effect lubrication of the blower by hand. Originally the air ducts were made of cast aluminum, but later the design was changed and most of the parts were made of welded sheet steel. A sheet-steel tank of 1.8 cu. ft. capacity was incorporated in the line between the de-

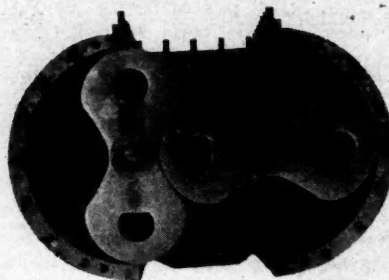


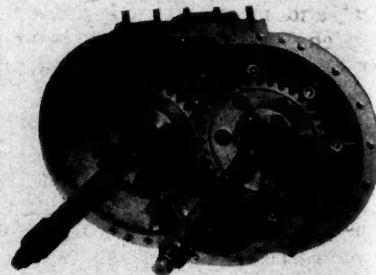
Fig. 2—Supercharger with rear end plate removed

livery side of the supercharger and the inlets to the two carburetors.

A hand-controlled butterfly valve located in a short pipe on top of the supercharger tank serves to by-pass to the atmosphere all air not needed for the engine and forms the only supercharger control. An automatic inlet valve located in the air duct immediately back of the rear carburetor enables the engine to draw air directly from the atmosphere in case the supercharger should fail. This is a 5-in. poppet valve, held closed by its own weight and the excess pressure in the air duct when the supercharger is functioning. Back of this valve there are four baffle plates made of 0.035-in. sheet steel, which contain $30\frac{3}{4}$ -in. holes each. The holes in successive plates are staggered.

Various changes in design brought the weight of the supercharger assembly up to 151 lb., an increase of 30 lb. over the original weight. As now made, the

Fig. 3—View of gearcase, gears and rotor shafts of Roots supercharger



supercharger itself weighs 88 lb.; the coupling, 10 lb.; the supercharger tank, 24 lb., and the air ducts, 29 lb.

The power theoretically required to compress 1 lb. of air per second adiabatically from an absolute pressure P and absolute temperature T to an absolute pres-

sure rP may be calculated by means of the equation:

$$Hp. = 0.336 T (r^{0.336} - 1)$$

and the efficiency of the supercharger is equal to the ratio of power thus calculated to the power actually absorbed as determined by dynamometer measurements. Tests of the N. A. C. A. supercharger showed it to have a maximum efficiency of 82 per cent at low speed (600 r.p.m.) and low compression ratio (1.2), the efficiency decreasing uniformly with the compression ratio to a little over 60 per cent for a compression ratio of 2.3 for all speeds of from 1000 to 1800 r.p.m.

The volumetric efficiency of the supercharger decreased with the speed, in which respect the Roots blower differs from a piston type of pump, such as an engine cylinder. This shows that the loss in volumetric efficiency is due not so much to wire drawing at the inlet as to leakage past the rotors. When the rotors turn at low speed there is more time for air to leak by them. The volumetric efficiency, moreover, decreases as the compression ratio increases. With a compression ratio of 2.25, the volumetric efficiency was very close to 90 per cent from 800 r.p.m. upward. With a compression ratio of 1.5, it attained 95 per cent at less than 800 r.p.m. and reached a maximum value of about 97 per cent.

Tests were made to determine what might be called the factor of safety of the rotors, by speeding them up in the atmosphere until failure occurred under centrifugal stresses. An aluminum alloy rotor failed at 9600 r.p.m., while a magnesium rotor made to the same dimensions failed at 13,500 r.p.m. The supercharger is designed for a rotor speed of 2550 r.p.m., and since the stresses due to centrifugal force vary as the square of the speed, it will be seen that the rotors have a very considerable factor of safety. The original supercharger was later used with a gear ratio of 1.95:1, which gave its rotors a speed of 3200 r.p.m., and was flight tested considerably at this speed, but developed no mechanical weaknesses.

In the laboratory tests of the supercharger a brief study was made of the effects of synchronizing the pul-

sations in the supercharger delivery with the pressure pulsations produced by the engine. It was found that when a receiver of considerable volume was inserted between the supercharger and the engine, such synchronization produced no noticeable effects, and without the receiver the engine operated very roughly over a considerable speed range, hence it was concluded that there was no particular benefit in synchronization.

There are at least four possible types of supercharger, viz., the reciprocating type, the sliding vane or eccentric type, the centrifugal type and the Roots blower type. All four have been used for the purpose of supercharging, but the reciprocating and sliding vane types have mechanical limitations, and the choice seems to lie between the centrifugal and the Roots blower type.

The centrifugal supercharger is sometimes driven by an exhaust turbine, and a turbine-compressor set makes a compact and handy unit. But the construction of the exhaust turbine involves difficulties, and another objection to the turbine-driven compressor is that it does not respond as quickly to the control as does the mechanically driven supercharger. Most centrifugal superchargers, therefore, are mechanically driven. If the driving ratio is constant, the proportional temperature increase of the air in passing through the supercharger will be constant, irrespective of altitude, and at ground level the air will be heated more than permissible. This calls for the installation of coolers, which, of course, add to the weight. Besides, the power required to drive the supercharger is just as large at ground level, where no supercharging is required, as at high altitude. With the Roots blower type of supercharger, as installed in accordance with the N. A. C. A. plan, although it handles a large quantity of air at ground level, there is very little power consumption and very little temperature rise, because the air is compressed only slightly. A delicate point in connection with the Roots blower is generally considered to be the maintenance of a close clearance between rotors and case, but no difficulties have been experienced from this cause in the tests with the N. A. C. A. supercharger.

Preheating Furnace for Large Parts

CONSIDERABLE difficulty is often experienced in providing the necessary preheating facilities for welding large cast-iron parts. Small pieces can be preheated by the oxyacetylene blow-pipe, or a blacksmith's forge is sometimes use, but the most practical and most economical method of preheating large pieces, particularly where the entire casting is to be heated, is often found in the use of a temporary firebrick furnace.

This is built of loose firebrick laid without mortar. It is quickly constructed and can be built to any size desired. The accompanying illustration shows a large preheating furnace encasing a heavy iron casting. Asbestos paper, having holes for draft if necessary, forms the top of the furnace. The spacing of



Welding large cast-iron part in preheating furnace

the bricks around the base of the furnace assures sufficient draft to raise the piece to the proper temperature, as is shown in the accompanying picture.

The fire must be regulated occasionally to keep the desired temperature and this is done by opening or closing the draft holes, rearranging the asbestos paper covering, moving hot coals from one place to another, or other means. When the casting has reached an even dull red heat an opening is made in the asbestos-paper cover just large enough to uncover the weld area, and welding is done through this hole.

After the weld is completed the entire casting should be covered with fresh charcoal, brought up to an even heat, and the finished work allowed to cool and contract in the dying fire.

Just Among Ourselves

Some Sales Executives Oppose Super-Service Plan

A FEW weeks ago we propounded the idea that passenger car dealers might well use so-called super-service activities as a means of bringing into their establishments competitive car owners and incidentally as a means of putting into their own pockets some steady profits which otherwise may rapidly go to specialized stations.

We thought at the time that there would be some factory sales executives who wouldn't applaud the plan vociferously, but put it forward anyhow because we still believe it has in it the germ of a good idea from the standpoint of the manufacturer as well as from the standpoint of the individual dealer. Objection from sales executives—and we have picked up a few since—is based, of course, on the fear that the dealer will devote himself to quick service activities at the expense of active selling and merchandising work. One sales manager thinks the retailer might use super-service as an added excuse for not going out and digging up prospects.

* * *

"Ask 'em to Buy" As They Get a Car Wash

SEEMS to us as though there were something in the idea, however, that the dealer who now makes excuses to the factory for dilatory sales effort probably is the type that is the hardest to stir to such effort. If "quick service" activities on his part brought more prospects to his establishment where he could "ask 'em to buy"

with a minimum of effort, isn't it reasonable to suppose that this particular type of dealer—even more than a vigorous dealer—might sell more cars than otherwise? It is hard to believe that the factory would have any more trouble stirring up this sort of relaxed retailer on car sales when he is doing a good business in oiling, greasing, car washing, brake service, etc. than when he isn't. In any case, we'd be mighty glad to get further comments and criticisms of the proposition from any angle at all.

* * *

New Vehicles, New Mergers Still to Come

WRITING about a year ago and commenting on the Chrysler purchase of Dodge, we predicted the rise of another automotive giant combine within 12 months. If we wanted to say "I told you so," we might point to the Hupp purchase of Chandler or Studebaker's acquisition of Pierce-Arrow and say "That's the one we predicted." As a matter of fact, we didn't have either of those developments in mind at the time we wrote. We still think, however, that at least one very big and very important consolidation of passenger car company interests remains to be made before too many months or years have passed. Probably nobody could do more than guess about the companies likely to be involved. We wouldn't even attempt that. It seems certain, however, that the industry still has ahead of it plenty of important developments both in the way of marketing alignments and in the way of striking new vehicles.

Aviation Now Integral Part of Automotive Industry

THE Society of Automotive Engineers has been insisting for a number of years that it is the logical technical society for the aeronautic as well as the automobile engineers; that its name as well as its facilities obviously and automatically include the engineering side of this new form of transportation made possible by the use of the internal combustion engine. We have always agreed with the Society in this conception of its functions and responsibilities. But the developments of the last few weeks have emphasized overwhelmingly the oneness, the unity of the aviation and automobile groups.

* * *

The World's Largest Manufacturing Industry


FOR a number of years it has been apparent that many automobile men were going to take an interest in aviation development in a financial as well as in a technical way. Today, however, that mere "interest" phase seems to have been passed. With another new consolidation of major aircraft interests under the leadership of prominent automobile men, following on the heels of several other big developments of similar character, the two industries have become one in a practical, operating way. They have been one psychologically for a long while past. With aviation an integral part, the automotive industry bids fair to continue in the future, as it has been in the past, the world's largest manufacturing industry, whatever developments may occur in other industries.—N. G. S.

Elements of Tractive Resistance Analyzed in Automotive Tests

Forces opposing vehicular progress are increased 50 per cent by light gravel road surfaces and total 700 lb. per ton in deep mud, Iowa State College finds.

By L. E. CROOKS

Lecturer, Automotive Engineering, Yale University



THREE subjects are covered in Bulletin 88 of the Iowa State College, by T. R. Agg, summing up the results of some four years' testing of the tractive resistance of automobiles, their air resistance and the coefficient of friction between tires and road surfaces. All the testing was done from 1924 to 1928 on highways (in the case of air resistance, on a railroad as well) in the vicinity of the Iowa Engineering Experiment Station, and not in a laboratory.

Tractive resistance is defined as the summation of all external forces opposing the motion of a vehicle in a direction parallel to its longitudinal axis on a level surface. It is composed normally of the rolling, air, and impact resistances. The first of these comprises mechanical losses incident to the turning of the wheel, and heat losses caused by the flexing of the tire as it passes over the road surface, or deflects it, or—in the case of deep mud—passes through it. Impact resistance is an increment added to the rolling resistance by the distortion and displacement of the tire on surfaces that are rough. It is interesting to note the paradoxical conclusion in the case of the well-known "washboard" road, where the inequalities are regularly spaced, that at certain fairly high speeds the impact resistance reaches a negative value—in other words, the rolling resistance is actually less than on a smooth surface. Professor Agg points out that the deleterious effects on the vehicle, not to mention the passengers, offset any gain due to the lowered rolling resistance. Air resistance is, of course, the resistance of still air to the passage of a vehicle through it.

The records of tractive resistance were made by towing a car at a given speed, then releasing it and allowing

it to coast to a standstill. An Ames space-time recorder mounted on the coasting car, together with previous measurement of the inertia and friction of the wheels (the axle shafts or differential gears were in each case removed) furnished the necessary data. (Air resistance was figured with a coefficient of 0.0025, and the usual efforts were made to control the conditions under which the tests were conducted.) Both high and low pressure tires were mounted on the vehicles. The method of procedure was carried out over a wide range of surfaces.

Results show no great variation of resistance on any normally smooth and hard surface; for a 2-ton vehicle with a frontal area of 28 sq. ft. the tractive resistances were: 10 m.p.h., 32 pounds per ton; 20 m.p.h., 42 pounds per ton; 30 m.p.h., 59 pounds; 40 m.p.h., 84 pounds. A spongy subgrade under a thin crust, as on light gravel roads, which bends but does not break under the load, increases the resistance by 50 per cent at 20 m.p.h.—a condition of considerable interest to bus and truck operators. An inch of mud on an earth road doubles the tractive resistance at the same speed, while the deep mud of spring runs the resistance up to some 700 pounds per ton. Very rough surfaces increase the tractive resistance by 15 to 20 per cent at corresponding speeds. The percentage of increase is slightly higher than this for roads on which loose gravel or earth has been left for the passing traffic to pack down—an obviously uneconomical way of building up road surfaces.

Experiments were made to determine the effect on the tractive resistance of inflation pressure and temperature variations in the tires. The results were at best qualitative; variables were not susceptible of control outside the laboratory.

Measurements of the coefficients of friction between tires and road surfaces were rather fruitful. Such a coefficient expresses the force required to slide the tires of a vehicle divided by the normal pressure between the tires and the road. The average of more than 700 determinations, on ten types of road surface, gives this coefficient a value of 0.82. More force is required to initiate sliding than to maintain it, the coefficient for this latter condition being 0.75. The coefficient was found to be 0.2 less for sidewise motion than for motion along the path of travel, and the application of about 0.4, the force required to cause sidewise skidding, caused considerable creeping of the tire to the side.

On certain asphaltic roads, the coefficient was higher for a wet than for a dry road due to melting of the dry surface layer under the sliding tire. The actual coefficients obtained are too numerous to quote. They range downward from 0.9 on clean Portland cement or asphaltic concrete roads to 0.07 for smooth solid tires on smooth ice. The coefficient is in

general slightly lower—by 0.1—on wet than on dry roads, though the difference between wet and dry increases on the lower type roads. No coefficients for clay roads were given. The figures show balloons and high pressure tires to give indiscriminate coefficients, as do high pressure tires with varying pressures.

Professor Agg also reports some efforts to determine the coefficient of air resistance by two rather unique methods. An automobile was mounted upon a flat car with its wheels resting upon a sensitive recording dynamometer. The flat car was pushed at a uniform rate of speed over a level track by an electric locomotive. The dynamometer gave the air resistance in pounds, the automobile was photographed and the photograph measured by a planimeter to obtain the frontal area. The velocity was also measured, and a value for the air resistance coefficient obtained as 0.00241. By another method involving the use of the Ames space-time recording instrument as mentioned in connection with the tractive resistance tests, and a measurement of the wind velocity by anemometer in runs made against and with



the wind, values of 0.00224 and 0.0015 (for two different vehicles) were obtained. It was concluded—rather unwarrantably—that for all practical purposes a value of 0.0025 was sufficiently accurate.

Both the values actually obtained and the conclusions drawn seem open to criticism. In both experiments the speeds did not exceed 40

m.p.h. At this speed figures for air resistance lie rather close together, and values and errors are small. The high and low coefficients given represent a difference in resistance of 37 per cent at 60 m.p.h. for an average car! Yet both these cars were Fords, of approximately equal frontal area. The railroad test does not duplicate road conditions in that the automobile is not moving over the surface on which it rests.

On the whole, Bulletin 88, containing some material from earlier (1924) bulletins—notably No. 67, is a valuable contribution to our knowledge of the elements through and on which all motor car transport must move. The figures on tractive resistance and friction coefficients on the earth and other low-type roads should be brought persistently to the attention of state highway officials and the public. The bulletin would perhaps have been more valuable had a more forward-looking procedure been used. To make three runs on high pressure tires for one on balloons—and that at a pressure subnormal even in 1926, is to deprive subsequent investigators of data they would be glad to have.

Machine Tool Depreciation

(Continued from page 910)

should be considered when setting depreciation rates. Otherwise, the cost records will be likely to show a residual value on obsolete equipment too largely fictitious and so delay its replacement to the consternation of the man who is responsible for producing the product.

An optimistic feature of the survey is the attention which has been given to special purpose tools. In every type of machine listed in the survey, the average length of life of special purpose tools is considerably less than that of standard equipment. This, of course, is a recognition of the obsolescence factor. Special tools, in general, are just as well built as standard tools and should have about the same physical opposition to wear. The fact that they are special, however, renders them much more susceptible to obsolescence and this factor undoubtedly has been considered in setting depreciation rates for this type of equipment.

On the whole, the results of the survey indicate that there still remains a great deal to be done by some automotive plants before their depreciation policies are in consonance with modern ideas. Reports from some of the plants covered in the survey indicate that the problem has been given intelligent study and that individual rates have been set upon a logical basis. In too many others, however, there appears to be little evidence that depreciation has been considered of any importance. Many production men apparently still think

of depreciation as an accounting problem which has little or nothing to do with their own work. But if they could follow through the details of denials of some of their requests for new equipment they might, in many instances, find that depreciation rates are of real importance to them.

Railway Containers in England

CONSIDERABLE progress is being made with the introduction of the container system of freight shipment in England. A year ago only 350 containers were owned by British railways, while now they have 2000, and many more are in production. The containers are of steel construction and are provided with locks. They can be placed either on flat cars or on motor trucks. A flat car will hold five, and each of them may hold a consignment from a separate shipper. This system, therefore, enables shippers of less than carload lots to have their consignments collected, transported and delivered without disturbance and at a cheaper rate than they would be entitled to if their consignments were handled in bulk. Biscuit and chocolate manufacturers in England have used the container system for years, but recently it has been applied with success to many other products, including bricks, radiators, furniture and flowers.

Regulations for French Grand Prix Similar to 1930 Indianapolis Rules

*Contest boards of both nations desire to aid development
of race cars which would approximate more
closely commercial passenger vehicles.*

By C. EDWARD PACKER

A SINCERE desire to develop race cars that will be less expensive to buy and operate than the present type, and which will appeal more strongly to the public is seen in the new racing rules both in this country and abroad.

Rules for the 1930 Indianapolis 500-mile race were published on page 812 of the May 25 issue of *Automotive Industries*. They grew out of the desire of the Indianapolis Motor Speedway to present to the public a new development in race cars—preferably a type that would more closely approximate, at least as far as the chassis is concerned, a highly efficient commercial passenger vehicle.



The winners of the Indianapolis 500-mile race on last Memorial Day. Ray Keech (left), in the Simplex Piston Ring Special, finished first, covering the circuit in an average of 97.585 m.p.h. Louis Meyer, driving a Miller Special (center), averaged 95.596 m.p.h. for second place, and Jimmy Gleason (right) came in third in a Duesenberg

The Indianapolis rules were designed and promulgated by the Speedway body after careful consideration and discussion in a meeting of engineers of most of the important American automobile factories and interested representatives of the technical press and other allied factors.

Likewise in Europe, representatives from Germany, Austria, Belgium, Spain, France, Great Britain, Italy, Sweden, Switzerland and the United States met and decided upon the rules that shall govern the Grand Prix d'Europe to be run on June 30, 1929, and in 1930.

A feature of the Grand Prix will be the limited gasoline rule, which appears to be peculiar to the Grand Prix. Italy has decided that the race at Monza shall

be a free-for-all event. England, Belgium and Germany will not organize Grand Prix races.

The new rules for both France and Indianapolis will lead to a greater similarity between American and European racing cars. It is interesting to compare the rules in detail.

For European events, the rules read: All types of motor cars are admissible with reservation of an inspection of the crankcase, speedometer, tanks, etc. . . . and in general of all parts containing oil and gasoline to be utilized for the running of the motor.

"To each competitor must be given a sufficient quantity of oil and gasoline calculated on the basis of 14 kilograms (30.8644 lb.) per 100 kilometers (13.8 miles per U. S. gallon). The gasoline must be ordinary commercial fuel.

"The minimum weight of the empty car including sparewheel and tire must be 900 kilograms (1984.14 lb.).

"The cars must have bodies with two seats, width to be at least 1 meter (39.37 in.), at the base of the seat and this width must

extend at least for a height of 25 centimeters (9.8425 in.).

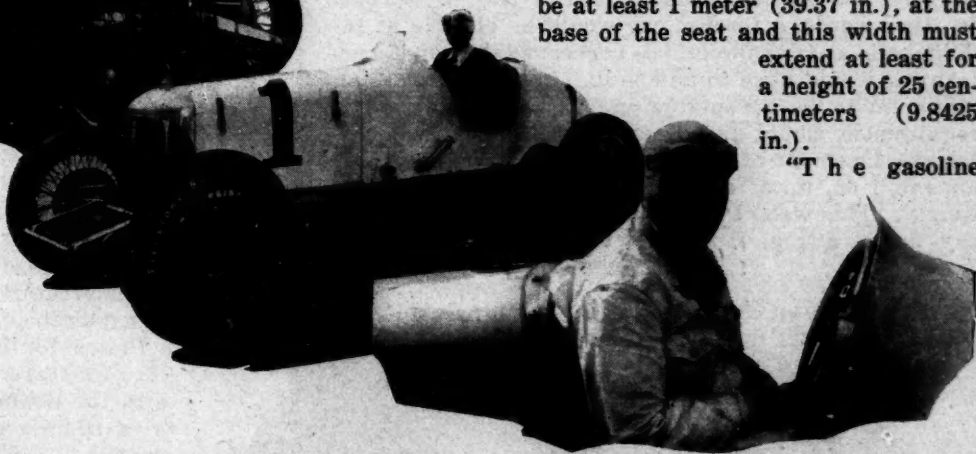
"The gasoline

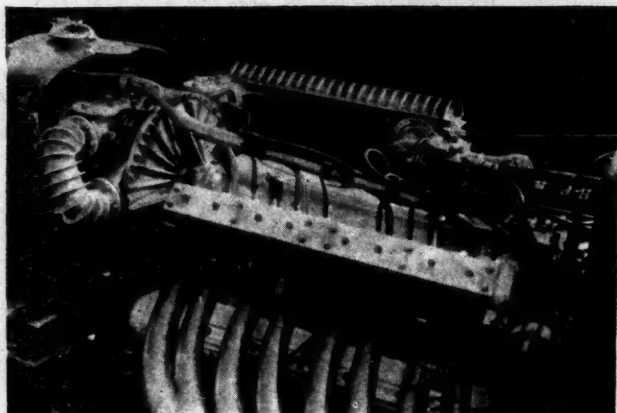
tank, type of which is regulated, must be accessible and visible and must be placed in back of the seats neatly separated from the body and should not be prolonged by any fuselage."

It was suggested that the minimum distance for the Grand Prix d'Europe be fixed at 600 kilometers (372.822 miles).

Consideration of the foregoing rules when developing race cars for the Indianapolis event will make it possible to enter these same cars in Europe with slight or no alterations. On the other hand, European manufacturers may be able to produce race cars for the Indianapolis race as well as contests on their side of the ocean.

The restriction in America on foreign cars would



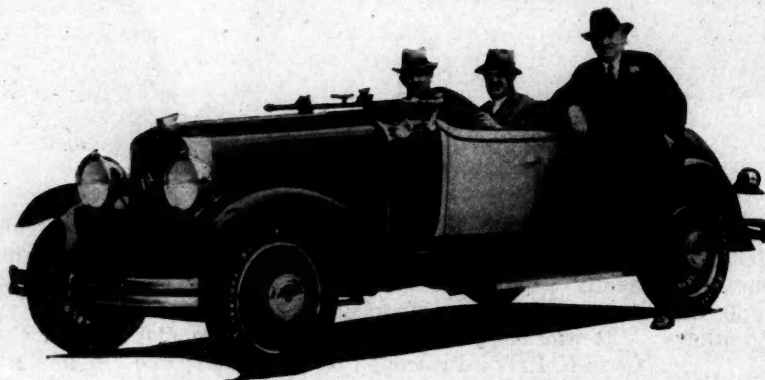


Powerplant of the Detroit Special, entered by Tommy Milton. This view shows the construction between the two stages of the supercharger. About \$140,000 is said to have been spent in developing this car

come from the exclusion of superchargers, excepting those of the positive displacement type allowed only on Diesel or two-cycle engines. Also, it will be recalled that but two carburetors (or one dual carburetor) will be allowed on four-cycle entries, and that these cars may have but two valves in each cylinder. Because of the fuel economy requirement placed on European contestants, it would be unlikely that any foreign cars would exceed the new Indianapolis limit of 366 cu. in. of displacement.

With the maximum size engines permitted next year, it is unlikely that American cars can compete on the European fuel allowance. Furthermore, the fuel that will be supplied will be ordinary commercial gasoline, so cars of high compression probably would perform poorly.

The minimum weight permitted is 1750 lb. in this country and 900 kilograms (1984.14 lb.) in Europe. In other words, a foreign car would be eligible at Indianapolis as far as weight is concerned, but an American car would have to be 234 lb. above the American minimum to be acceptable in Europe. This weight requirement would qualify an American car for a piston displacement of 264.5 cu. in. based on the allowance of 1 cu. in. of displacement for every 7½ lb. of weight. This weight is of the complete car with tanks dry, but in Europe it includes a spare wheel and tire.



View of the Studebaker President Eight sports roadster, which paced the Indianapolis Race on Memorial Day. Standing beside the car is Albert R. Erskine, president of the Studebaker Corp.; at the wheel is Harold S. Vance, vice-president, Studebaker Corp., in charge of manufacturing, and seated at the latter's right is Paul G. Hoffman, vice-president, Studebaker Corp., in charge of sales. The corporation has decided since the race to produce a number of these roadsters

The greatest similarity comes from the American change back to cars with seats for a driver and a mechanic. Cars at Indianapolis in 1930 will be required to have a body width across the seats of not less than 31 in. With the European requirement for this dimension 1 meter, American cars would have to exceed their minimum width requirement by 8.37 in. to be acceptable in European events.

The height to which the body must extend at the widest part of the seat is not specified for American competition but is set at 25 centimeters (9.8425 in.) for the foreign races.

Pointed tails are outlawed in the European rules unless they actually form the gasoline tank. In this connection, objection was made to the use of any fuselage added to the tank to improve the streamlining.

Nothing was said about either the wheelbase or tread requirements for European cars. For the next Indian-



View of instrument board of Milton's Detroit Special. No. 1 indicates the outlet supercharger temperature gage; 2—stop clock; 3—supercharger pressure gage; 4—gasoline tank air pressure; 5—water pump temperature gage; 6—oil pressure gage; 7—inter-cooler outlet temperature gage; 8—engine tachometer; 9—gasoline tank air pressure regulator; 10—spark advance control; 11—valve to supercharger pressure gage

apolis race, treads must fall between 54 in. and 60 in. when measured between the centers of tire contact with the road. On wheelbase, there is no specific requirement other than that the cars be handleable.

Prizes to the amount of 260,000 francs (\$10,140) are being offered in connection with the Grand Prix. The race will be run on a 10-mile circuit at Le Mans. Of this amount, 100,000 francs have been contributed by the Automobile Club of France, while the remaining 160,000 francs were subscribed by automobile manufacturers. The race will comprise 37 rounds over the circuit.

There is no doubt that American cars will be well represented in the Grand Prix. In fact, several cars have already been reported as ready, but at this time nothing official has been released for publication. This is only natural, as premature announcements are likely to be inaccurate because of last-minute changes or to give secret information to competitors. The official contest board holds such data in confidence.

Grinding of Tungsten Carbide Alloy Requires Care and Technique

*Hard abrasive material is necessary for roughing, finishing
and stoning as well as relatively low machine speeds,
a rigid wheel and a solid support for metal*

By A. H. PREY

Engineer, The Carborundum Co.

MUCH has been written about tungsten carbide alloy, the new tool material; its extreme hardness, the amazing speed at which it will remove metal, the radical changes in machine design necessary to utilize it at its greatest efficiency and its probable effect upon the industry as a whole. Much has been written pertaining to it and to results obtained from it, but very little, if anything, has been written concerning one phase of its use which is important to the user—the problem of grinding it. And it is, indeed, a problem.

It is the purpose of this article to discuss briefly only the off-hand grinding problems confronting the user of tungsten carbide tools and to offer suggestions and to make recommendations based upon the experience of a manufacturer of grinding wheels.

The chief characteristic of tungsten carbide is its extreme hardness. Various Brinell figures show hardnesses from 1800 to 2400 compared to a maximum of about 800 for hardened high-speed steel when determined in the same manner (Rockwell no-load converted to Brinell figures). The new material will scratch sapphire, and its hardness lies between that of Aloxite (fused alumina) and Carborundum (silicon carbide). It is apparent then that an aluminous abrasive wheel is out of the question for use on this material and we must go to the harder abrasive, silicon carbide.

Tungsten carbide for tools is supplied to the trade at the present time in two forms. One a finished tool ready for use, and the other a roughly shaped piece to be mounted and ground to its final form by the user. Therefore, from the user's standpoint, there are two grinding problems involved where he mounts his own tool and there is only one where he buys the finished tool.

In the first case, the tool must be ground to its final form and finished to obtain the proper sharp edge, and a relatively large amount of stock must be removed. A soft wheel—grades P to V (Carborundum Company grading) and grits 40 to 60 in W bond—is recommended for this work. After forming there remains only the problem of regrinding, which will be described later in this article.

It must be kept in mind that shop conditions vary widely from one plant to another and this variation will have a marked effect upon the selection of a proper grinding wheel.

The regrinding of a tungsten carbide tool should, we believe, consist of three operations: (a) Rough grind, (b) finish grind, and (c) stoning or honing.

The rough grind is to bring the tool to its proper shape, and the finish grind and stoning are to give a smooth finish and a sharp edge. The makers of this material emphasize the importance of an edge free from grinding marks to its most efficient use. We believe that the combination of a finish grind on a fine grit wheel followed by a hand stoning operation with a small Carborundum stone will give the proper cutting edge. It may be possible to eliminate first operation (a), where the point of the tool is not badly worn, but where considerable stock is to be removed it should be carried out.

For these operations the following gradings of Carborundum products are recommended:

1. Rough grind—60 grit, N to U grades, W bond wheel.
2. Finish grind—100 to 120 grit, S to V grade, W bond wheel.
3. Stoning—Any fine grit, medium grade Carborundum Stone—for example—4x1x½—2F-G6.

In addition to the selection of proper grinding wheels for a good cutting edge, there are several points in grinding that should be watched. Wheel speeds should be low rather than high. From 4000 to 5000 surface feet per minute is about the correct range. The pressure of the tool against the grinding wheel should be light, otherwise excessive wheel wear will result with no faster cutting action. The user must expect a higher wheel wear than when grinding high-speed steel. In the efficient use of the tools made from these new metals, the clearance and tool angles differ from those standard for high-speed steel, and the manufacturer's specifications should be followed closely.

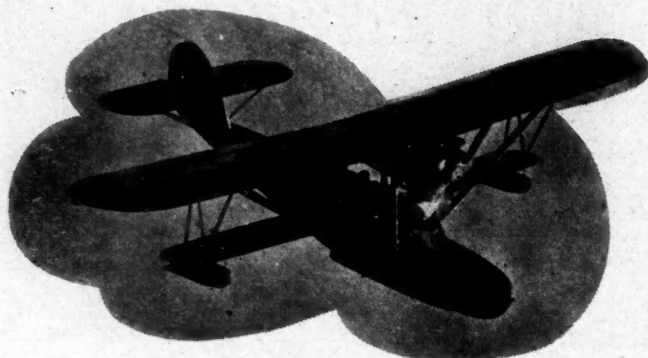
A rigid machine is essential, otherwise wheel wear will be excessive. The tool should be on a solid rest, otherwise if only applied by hand without a rest, bumping takes place and the wheel, which is very soft, will quickly get out of true. The tool should be approached to the wheel carefully and the heel should come in contact first, otherwise the tool will dress the wheel, or at best, a very ragged and chipped-edged tool will result.

The use of this new tool material is yet in the experimental stage, consequently the grinding problems are not yet completely solved. A material having such radical characteristics compared to those of high-speed steel, it must take time to develop to its utmost efficiency and so grinding wheels must develop along with it. We have dealt only with off-hand grinding.

Detroit Aircraft Corp. Interweaves

*The new organization, capital
nine companies, with a
activities and*

By LEWIS



Flying boat, built by the Eastman Aircraft Corp., now a division of the Detroit Aircraft Corp.

FURTHER evidence that the activities of the aviation industry will be closely interwoven with the automobile industry is given through the formation of the Detroit Aircraft Corp. This new organization, which will have a capitalization of approximately \$20,000,000, has been founded by a group of executives of high position in the automobile industry, who have joined hands with aviation leaders and influential bankers. The corporation will acquire nine aircraft companies, giving it wide diversity in its products. Control and a majority of the manufacturing activities will be centered at Detroit, and production will follow closely methods which have proved so successful in the automobile business.

The nine companies that will be included in the Detroit Aircraft Corp. are:

Mahoney-Ryan Aircraft Corp.
Aircraft Development Corp.
*Winton Aviation Engine Co.
Blackburn Aeroplane Co. of
Michigan

Eastman Aircraft Corp.
Lockheed Aircraft Co.
Marine Aircraft Co.
Aviation Tool Co.
Grosse Isle Airport, Inc.

The new corporation, it is stated, will have a broader scope than any other unit in the industry today for the reason it will build a complete line of lighter-than-air as well as heavier-than-air craft, and will produce motors as well as ships. The products of the various divisions to be consolidated embrace airplanes, small and large flying boats, and dirigibles. Its line of aircraft will embrace products selling all the way from \$3,000 for the smaller flying boats up to the largest dirigibles, costing from \$5,000,000 to \$6,000,000.

The active management of the corporation will rest in the hands of seven men, comprising the executive committee, four of whom are prominent in the automotive industry. All of them, however, have been associated with one or more aircraft companies for some time. Following are the names of these leaders:

*Partly owned only.

E. S. Evans, president, Evans Auto Loading Co., Curtiss Flying Service of Michigan and National Glider Association; treasurer and director, Stout-Detroit & Cleveland Air Services; director and member of the executive committee of Northwest Airways, Inc., director of the Bellanca Aircraft Corp., Curtiss Flying Service, Inc., National Air Transport, Inc., Stinson Aircraft Corp. and Wings, Inc., chairman of the aircraft bureau of the Detroit Board of Commerce.

William B. Mayo, chief engineer, Ford Motor Co.; managing director, Ford Aircraft activities; vice-president, Stout Air Services, Inc.; director of Transcontinental Air Transport, Inc., Northwest Airways, Inc., United Air Transport, Inc., Stout-Detroit & Cleveland Air Services, Pratt & Whitney Aircraft Co.

C. F. Kettering, president, General Motors Research Corp.; vice-president, General Motors Corp.; director, United Aircraft & Transport Corp. and Pratt & Whitney Aircraft Co.

Harold H. Emmons, chairman of the board, Aircraft Development Corp.; president, Northwest Airways, Inc.; director, National Air Transport, Inc.; director, Stinson Aircraft; officer-in-charge of aircraft engine production during the World War for the U. S. Army and Navy and allied powers.

Carl B. Fritsche, president, Grosse Isle Airport, Inc.; president, Aircraft Development Corp., and formerly secretary of National Air Transport, Inc.

Eugene W. Lewis, vice-president, National Air Transport, Inc.; president, Industrial Bank, Detroit; director, Northwest Airways, Inc.

C. S. Mott, vice-president and member of finance committee, General Motors Corp.

The officers of the new corporation will be: E. S. Evans, president; Harold H. Emmons, chairman of the board of directors; Carl B. Fritsche, vice-president; Charles A. Parcels, secretary; Edward T. Gushee, treasurer.

In addition to all members of the executive committee and all officers, the directorate will include: Ralph H. Upson, consulting engineer, Aircraft Development Corp. and Aeromarine Klemm Corp., formerly chief engineer, aeronautics department, Goodyear Tire & Rubber Co.; Arthur Schwartz, capitalist; R. E. Olds, chairman of the board, Reo Motor Car Co.; R. D. Chapin, chairman of the board, Hudson Motor Car Co.; Frank W. Blair, president Union Trust Co., Detroit, and Director of Northwest Airways and Stinson Air-



Harold H. Emmons, chairman of the board, Detroit Aircraft Corp.

Aviation and Automobile Industries

ized at \$20,000,000, will control wide diversity in flying manufactures.

C. DIBBLE

craft Corp.; C. H. Harrah, president, C. W. Harrah Co.; Sheldon R. Noble, H. W. Noble & Co., Detroit, investment bankers; J. Speed Elliott, August Belmont & Co., New York, investment bankers; Thomas N. Dysart, Knight, Dysart & Gamble, St. Louis, investment bankers; Harold M. Bixby, vice-president, State National Bank of St. Louis, and director of the Ryan Aircraft Corp.; P. De C. Ball, president and chairman of the board of the Ryan Aircraft Corp.; Harry H. Knight, director, Transcontinental Air Transport and Ryan Aircraft Corp.

"The Detroit Aircraft Corp. will be an operating company in every sense of the word," stated E. S. Evans, president. "A majority of the divisions already have achieved distinction as producers of various types of aircraft.

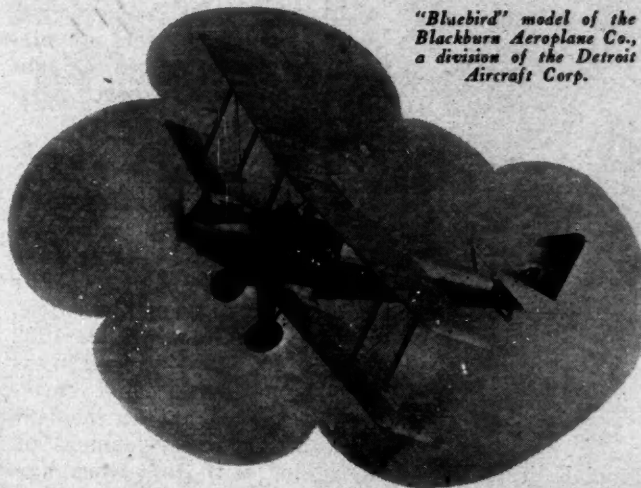
"The aviation industry has passed out of the stage of infancy and is now prepared for a period of intensive development. The Detroit Aircraft Corp. will be among the leaders in that development. We will apply the famous Detroit industrial methods to the building of aircraft of every description. Each of the companies, which is now building an established and recognized plane, will form a separate division of the parent company, which will direct all manufacturing and selling activities from its Detroit headquarters.

"We will offer to the industry engineering experience, complete facilities, financial stability and technical ability. The directors of this company will include men of wide industrial experience, leading engineers in the aviation and automotive industries, business executives and financiers. We believe we have gathered together as strong an executive organization for the management of this corporation as can be formed.

"Further, because of the fact that the corporation will engage in the manufacture of lighter-than-air as well as heavier-than-air craft, we will be in a particularly advantageous position, participating in the growth of all branches of air development and not entirely dependent upon any outside source for a supply of motors. In short, the Detroit Aircraft Corp. will be probably the most self-contained unit in the industry."

Financing of the new corporation was done primarily in Detroit, and a major part of the stock will be held in and around Detroit. The plan for the public financing is being worked out by the banking houses of H. W. Noble & Co., of Detroit; August Belmont & Co., of New York, and Knight, Dysart & Gamble, of St. Louis.

"Bluebird" model of the Blackburn Aeroplane Co., a division of the Detroit Aircraft Corp.



The new corporation has been organized under the laws of the state of Michigan and has 2,000,000 no par shares authorized. The various companies involved in the new organization are being acquired through an exchange of stock, and on the present set-up it appears that approximately 1,300,000 shares of the authorized stock will be outstanding, the exact number depending upon the extent of trading necessary. On the basis of present market prices it is said this will represent a capitalization of approximately \$20,000,000.

A resumé of the various companies which are being acquired by the Detroit Aircraft Corp. follows:

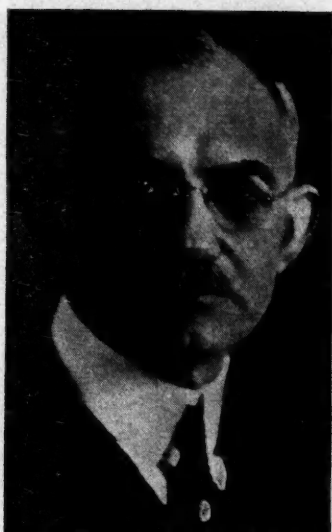
The Lockheed Aircraft Co., located in Los Angeles, was formed in 1926 as the outgrowth of development and experiment in design and construction of airplanes conducted by Alan Laughead (pronounced Lockheed) and his associates as far back as 1909. The company has 138,233 shares of no par value stock outstanding, and the stock has ranged between \$18 and \$26 a share on the Los Angeles Curb Exchange thus far in 1929. Executives of the Lockheed Aircraft Co. are: F. E. Keeler, president; B. S. Hunter, executive vice-president

and general manager; Alan Laughead, vice-president, and Whielty C. Collins, secretary and treasurer. The Detroit Aircraft Corp. has purchased the stock interest of those who have working control of Lockheed, and the corporation will make an offer to other holders of stock to exchange their Lockheed stock on a basis of one and one-third share of Detroit Aircraft Corp. for each share of Lockheed held. The manufacture and assembly of the Lockheed plane will continue in the present Los Angeles plant, although metal parts and stampings will probably be fabricated in Detroit.

Ryan Aircraft Corp.—Builders of Lindbergh's "Spirit of St. Louis," of the plane which recently established a new world endurance record at Fort Worth, Tex., and of the plane in which the woman's altitude record was established last week at Los Angeles. Has a large



Edward S. Evans, president, Detroit Aircraft Corp.



William B. Mayo, director of Detroit Aircraft, and chief engineer, Ford Motor Co.

plant just outside St. Louis, where the "Ryan brougham" is manufactured. Has one of the largest distributing organizations in the world, is one of the principal American manufacturers of airplanes. Does a substantial export business.

Aircraft Development Corp.—Now building the ZMC-2, an all-metal dirigible, for the United States Navy Department, at its plant on Grosse Isle, Michigan. Since 1922 has been engaged in experimental and development work incident to the development of

all-metal aircraft. In connection with this work has developed an entirely new automatic riveting machine for use in metal construction, which has a high potential value. This machine makes possible the application of Detroit industrial methods to metal aircraft construction and already is in wide demand, although no rights for its use have yet been granted. The machine operates almost as a sewing machine, placing three rows of rivets simultaneously and precisely. With this machine two men can do the work formerly requiring 128 men, as it will place 40,000 rivets per day. The company also is preparing to build a moderately priced six-place amphibian metal flying boat.

The Aviation Tool Co. is also being newly formed, and it is taking over the patents and rights on tools and production methods of the Aircraft Development

Corp. The company will also be located in Detroit, and it will develop and construct machines and tools of various descriptions for metal-craft construction. The Aviation Tool Co. will have a nominal capitalization, entirely owned by the Detroit Aircraft Corp.

Marine Aircraft Co. is being organized under the laws of Michigan, and will manufacture at Detroit a six-place amphibian all-metal flying boat, which will go into immediate production. This boat has been developed by the Aircraft Development Corp.

Eastman Aircraft Corp.—Recently formed for the construction of a new and improved flying boat—the "Sea Rover"—to sell at a moderate price. James H. Eastman, associated with aeronautical development since 1912, and designer of the "Sea Rover," is president of the company.

Winton Aviation Engine Co.—Recently organized for the development and manufacture of Diesel engines for aircraft, as a subsidiary of the Winton Engine Co., a pioneer in the manufacture of Diesel and gasoline engines.

Blackburn Aircraft Corp.—A company being organized under Michigan laws to acquire all rights, designs, patent privileges, etc., for all of North and South America, except Brazil, of the Blackburn Aeroplane & Motor Co., Ltd., one of the largest and strongest manufactur-

(Turn to page 925, please)



C. F. Kettering, director, Detroit Aircraft Corp., and vice-president, General Motors Corp.

Financial Aspects of the Merger

UNDER the financial set-up of the Detroit Aircraft Corp., the new organization is authorized to issue 2,000,000 shares of no par common stock. There will be outstanding 922,745 shares after the corporation completes acquisition or financing of the nine companies which it is absorbing. Of this number, 300,000 shares will be offered for public subscription at \$15 a share on Friday, June 14, by August Belmont & Co., of New York City; H. W. Noble & Co., of Detroit, and Knight, Dysart & Gamble, of St. Louis. This means that 622,745 shares of stock will be used in acquiring or financing the various companies.

In addition to the 922,745 shares already mentioned, the corporation is also inserting an additional 300,000 shares for sale to bankers, and to the management.

The various companies were acquired or formed as follows:

Lockheed stockholders will receive one and one-third shares of Detroit Aircraft Corp. stock for each share of Lockheed stock held.

Ryan Aircraft stockholders will receive two shares of Detroit Aircraft Corp. stock for each share of Ryan held.

Aircraft Development Corp. will receive one share of Detroit Aircraft Corp. for each share of Aircraft Development Corp. stock.

The Winton Aviation Engine Co. is being formed with \$1,000,000 capital, and is being segregated from the Winton Engine Company. The Detroit Aircraft Corp. is paying \$400,000 cash for a 40 per cent interest in the new Winton company, the balance being owned by the Winton Engine Co.

The Aviation Tool and Marine Aircraft and Grosse Isle Airport companies are being formed by the Detroit Aircraft Corp. with a nominal capitalization, which will be entirely owned by the Detroit Aircraft Corp. Grosse Isle Airport comprises 403 acres upon which \$100,000 already has been spent for improvement.

Blackburn Aircraft Corp. is a new company being formed under Michigan laws, of which 90 per cent of its stock will be owned by the Detroit Aircraft Corp. and 10 per cent will be owned by the parent Blackburn Co. of England, which it receives for patent rights, good will, etc.

Eastman Aircraft Corp. was acquired through a cash transaction, exact amount not being disclosed.

New Automotive Developments

Brown & Sharpe Milling Machines

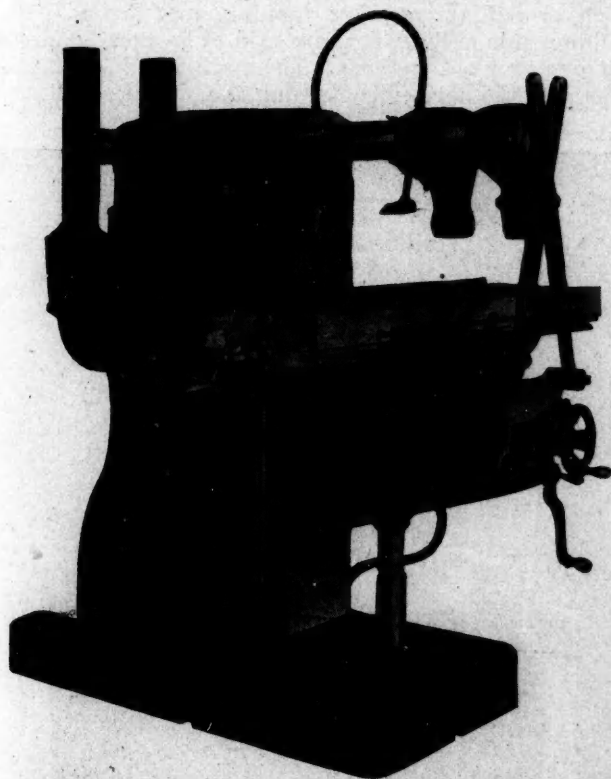
BBROWN & SHARPE MFG. CO., Providence, R. I., has added to its line of standard milling machines the Nos. 4A standard universal and 4B standard plain milling machines. These machines are the largest of the Standard line and include construction and operating features of the other standard machines. They are all gear driven with anti-friction bearings from driving pulley to spindle and in the feed and power fast-travel mechanisms. Two operating positions are provided on each machine with all levers controlling the operation of the machine readily available from either position.

Dual control facilitates feed changes. The rate of feed and speed for which the machine is set is indicated by direct reading dials. The machines are equipped with power fast-travel for longitudinal, transverse and vertical movements.

An important feature of the No. 4B standard plain milling machine is the automatic disengagement of the power fast-travel, with simultaneous engagement of the cutting feed, without any attention on the part of the operator. Automatic lubrication, with filtered

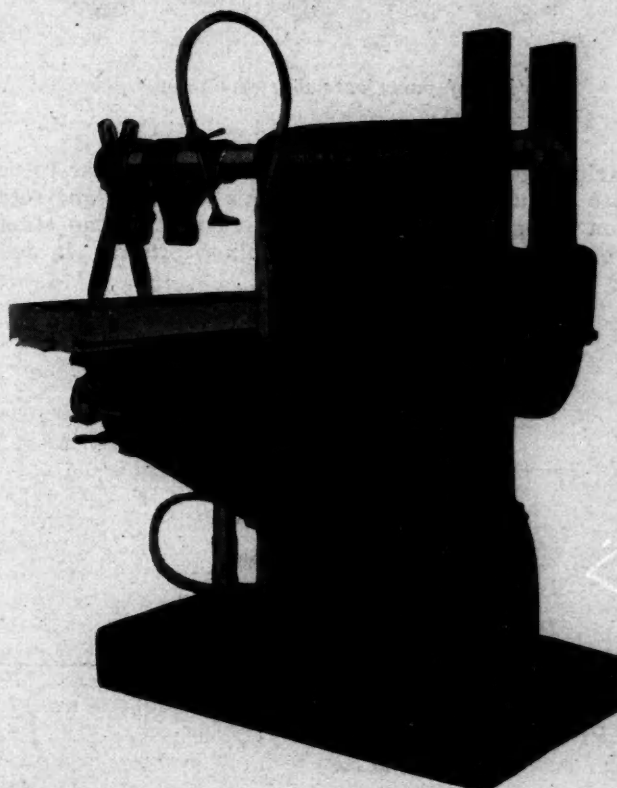
pose. A single oil well lubricates the saddle and table bearings.

The machines are available with belt drive, fitted for motor, or equipped with motor. When motor



B. & S. No. 4A Standard Universal Milling Machine

oil, is provided for all mechanisms within the column and the driving pulley of each machine. Automatic oiling is also provided for the knee assembly, a separate pump being installed in the knee for this pur-



B. & S. No. 4B Standard Plain Milling Machine

driven, the motor is located in a ventilated compartment in the base and drives the machine by chain and sprockets.

Krohn Differential Changes

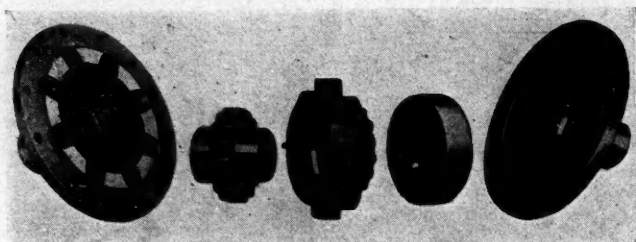
ADDITIONAL factory facilities have been acquired recently by the Krohn Differential Corp. of Chicago, and the differential of this firm, which is of the non-slipping type and has been sold for replacement purposes since 1924, will hereafter be made also for original equipment.

The Krohn differential, like the conventional type, permits one driving wheel to turn faster than the other when rounding a corner. It lets one wheel turn when that wheel is jacked up, but it does not allow one wheel to spin idly, robbing the other of power, when driving on wet paved roads, through mud or over roads that are slippery with snow and ice.

The device consists of a housing made in halves,

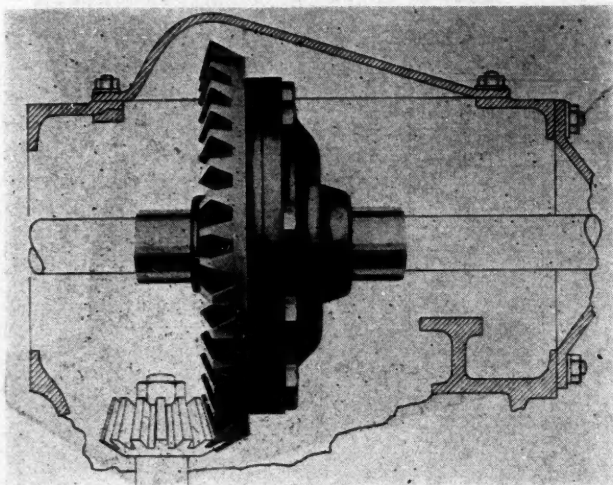
with three gears mounted therein, two of them being splined to the two differential shafts respectively, and the third to the housing, this third gear meshing with the other two.

The differential action is obtained, when traction varies, by a difference in the number of teeth in the



View of parts assembly of Krohn differential

various gears, which permits the central gear to rotate about the other gears. This allows slight rotation of one driving wheel with respect to the other, which is necessary when rounding corners. It does



Krohn differential for installation in a truck of standard make

not, however, allow complete freedom of rotation of either driving wheel with respect to the other. And it is this fact which prevents wheel spinning and insures getting power to the wheel that has traction.

Adams Lubricating System

ADAMS GREASE GUN CORP., 239 Fourth Ave., New York, has developed a new chassis lubricating system which features a fitting which can be serviced with a push type, bayonet or ball coupler gun. The new fitting embodies all of the speed and advantages of the push type system plus means for making a locked connection with a bayonet or ball coupler to the same nipple, when high pressure is needed to clear a frozen or clogged bearing.

The Adams Push Type gun develops 6000 lb. pressure and will operate with any brand of grease or oil. The screw type can be purchased with the bayonet coupler

or the ball coupler screwed directly into the gun, or with ball-link hose. It is guaranteed against leakage and will withstand 10,000 lb. pressure.

National Handnib

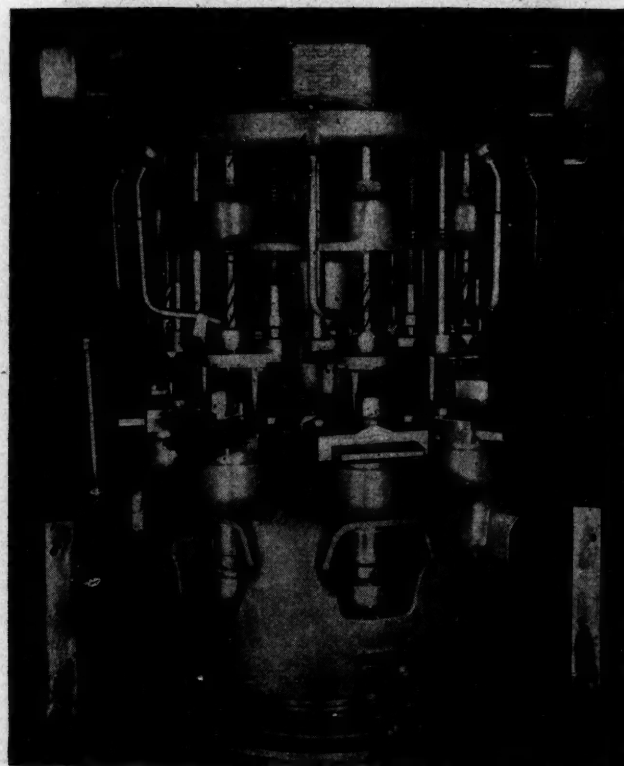
THE National Machine Tool Co., Racine, Wis., has developed Model A-5 Handnib, which is a combination drill rod cutter and irregular shaped nibbler. It cuts drill rods up to $\frac{3}{8}$ in. diameter and can also be used for outside nibbling to cut templates and sheet metal up to $\frac{1}{8}$ in. flat stock. Inside nibbling is also possible, simply by drilling one hole only and nibbling to the desired shape. The depth of cut for this work is 3 in. from any outside edge.



National Handnib cutting drill rod

Enterprise Multiple Drill

THE Enterprise Mfg. Co. of Pa., Philadelphia, Pa., is marketing the Enterprise Multiple, a continuous drilling machine, by means of which various operations such as drilling, reaming, tapping, spot facing, hollow milling, side milling, etc., are said to be greatly speeded up over previous methods. The machine has eight spindles and the carrier containing the spindles and work



Detailed view of Enterprise Multiple rotary drill press with guides removed showing individual work tables set up for drilling in automobile locks

tables rotates continuously around the columns. There is a work table for each spindle and during each revolution of the carrier, each table drops clear of the drill and is again raised and fed to the drill. The operator merely inserts and removes pieces at the front of the machine. Spindle gears mesh with a combined spur and bevel gear driven through a bevel pinion and a pair of spur gears by the right end of the pulley shaft. Spindle speeds are changed by changing the pair of spur gears. The carrier is driven from the left end of the pulley shaft through the change gears, planetary gearing, a second bevel pinion and bevel gear. A roller at the bottom of each table plunger rides on a fixed ring cam. The cam shape determines the feed motion. Individual table adjustment is possible for each table, or simultaneous adjustment of all tables is possible by means of a crank and worm. The shafts, cam rollers and roller shafts are made of high carbon steel while the spindles are of 5100 S.A.E. steel.

The rotating speed of the table can be varied from 0.76 to 2.5 times per minute, while spindle speeds can be varied from 400 to 2000 r.p.m. The machine can be arranged for belt or individual motor drive.

Detroit Aircraft Merger

(Continued from page 922)

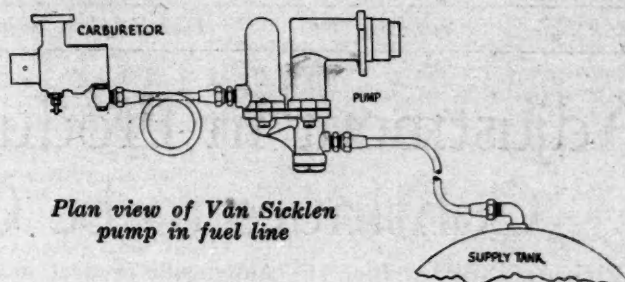
ers of aeroplanes in England. The British company was started in 1909, and during the war built a very large share of the military planes and flying boats. It was one of the pioneers in the building of all-metal planes, and all of its ships now are of metal. The company manufactures a complete line of planes and flying boats, from one-seaters to 50-passenger ships, and its engineering skill and full technical assistance will be turned over to the American company, in which the British company will have a stock interest.

The Grosse Isle Airport, Inc., is being newly formed to take over the flying field established on Grosse Isle by the Aircraft Development Corp. The Grosse Isle Airport is located on an island in the Detroit River, connected to the mainland by two bridges, covering 403 acres and 17 miles from the city hall of Detroit. Over \$100,000 has been spent on improvements so far, and other projects are under way which will make it one of the largest and finest airports in America. An international toll bridge is to be built to Canada, having been already authorized by the governments, and the American government is expected to designate this an international port of entry into Canada. There is a well-protected seaplane and flying boat harbor, and it is planned to maintain an amphibian taxi service from the island to the city of Detroit, which will make the airport accessible in a few minutes from the heart of the city. There is a modern and beautiful "aviation country club," known as Chateau Voyageurs, at the edge of the airport, providing complete club facilities. The Curtiss Flying Service, Inc., has selected the airport as its Detroit base of operations, and is establishing a large organization there, which in turn gives the airport a considerable annual revenue. The state in cooperation with the Navy Department is building a naval reserve base on the adjoining harbor. Other private enterprises are planned which should give the port a considerable earning power.

Van Sicklen Fuel Pump

A NEW fuel feed pump for the original equipment field has been placed in production by the Van Sicklen Corp. of Elgin, Ill., a subsidiary of Allied Motor Industries.

The pump consists of two chambers, one housing a float mechanism and the other acting as a pressure



Plan view of Van Sicklen pump in fuel line

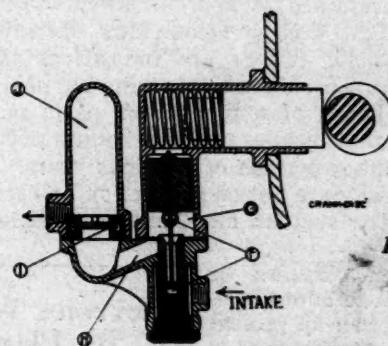


Fig. 1—Cross-section view of pump

chamber between the float chamber and the carburetor. At its upper end the float chamber communicates with a cylinder in which a piston is reciprocated by an eccentric on the engine camshaft and a return spring. The float carries a double acting valve which closes the inlet passage to the float chamber both when the float on rising attains a certain level, and when, on descending, it falls to a certain lower level. There is a flat check valve between the float chamber and the pressure chamber.

Referring to Fig. 1, when the pump is first started it is completely free of fuel, the various chambers and ports being filled with air. When piston A is moved outwardly by eccentric C and returned by the compression spring, the successive cycles of suction and compression pump the air out of the system and create a vacuum therein, raising liquid from the supply tank through valve F into chamber G.

On the pressure stroke of the piston, fuel is forced from the float chamber through port H and through outlet valve I into pressure chamber J, and thence to the carburetor.

As soon as the carburetor bowl has been filled, pressure is built up in the system by the pump working against the closed needle valve of the carburetor, and this pressure accumulates in chambers G and J. This raises the float in chamber G and closes float valve F, so that no more fuel can enter the float chamber, and none is pumped.

At normal engine speeds the inertia of the liquid in the main supply column is sufficiently great to prevent surging, and the continued operation of the piston results only in alternate compression and expansion of the air or vapor in the pump above the fuel level. This continues until the carburetor needle valve admits more fuel.

First with
the News

Reliable,
Accurate

News Industry



PAGE 926

VOLUME 60

Philadelphia, Saturday, June 15, 1929

NUMBER 24

Adjustment in Production Continues to be Gradual

PHILADELPHIA, June 15—Automobile production in the second week of June has been maintained at approximately the same rate as during last week when a slight decline below May operations was evident in the industry as a whole. There are indications that the output this month will show a more pronounced tapering-off near the close, although commitments in the hands of a number of parts makers would signify that the early summer schedules will be maintained at a stronger rate than in the corresponding periods of previous years. Several well known manufacturers practically are out of production on certain models, because of preparations for the regular mid-summer introduction of new automobiles.

Production has been curtailed or stopped on these models to afford dealers an opportunity to clean up present stocks, and to give manufacturers a chance to set their shops in order for the new cars to be introduced. While new car stocks throughout the country appear to be heavy, sales executives of a number of the large companies have expressed satisfaction with the situation. It is said that stocks are fully justified in the face of the retail demand for automobiles. The car stock situation remains spotted, with certain makers reporting a heavier ratio of stocks than others.

Announcement of the formation of the Detroit Aircraft Corp. to take over a number of going and newly organized aviation companies has created unusual interest in the industry this week, particularly because so many influential automobile manufacturers are identified with the venture. It is being generally accepted in Detroit that aviation, as a result of recent developments, is destined to become more and more closely affiliated with the automobile business.

Tracy Reports Sales

PONTIAC, MICH., June 15—Sales of new Oakland and Pontiac Sixes for the first five months of this year totaled more than 55 per cent of the entire output during the 12 months of 1928, W. R. Tracy, vice-president in charge of sales of the Oakland Motor Car Co., announces. May shipments of 28,444 cars to dealers bring the total during the first five months of 1929 to 145,868 units, a gain of 11 per cent over the 131,303 cars shipped in the same period last year.

Chevrolet Will Enlarge Its Plant at Tarrytown

TARRYTOWN, N. Y., June 11—Work will be started within a few weeks on enlargements to the plant of the Chevrolet Motor Co., at a cost of between \$3,000,000 and \$5,000,000, according to an announcement made to North Tarrytown's Board of Trustees by W. S. Knudsen, president of Chevrolet. Plans call for completion of the new buildings by Jan. 1, 1930.

The new plant is to be the biggest General Motors plant in number of cars produced daily, it is explained. Employment now runs to 2500 for the manufacture of 700 cars daily. The new buildings will increase the schedule and will provide for employment of about 3500 men. The Fisher Body Co. will occupy the plant abandoned by Chevrolet, it is said.

Chicago Registers 14,263

CHICAGO, June 12—New car registrations in May for Cook County (Chicago) totaled 14,263, as compared with 10,955 in May, 1928. Ford led the list with 3596, Chevrolet came second with 1651, Pontiac third with 1242, and Hudson-Essex fourth with 1225.

Pines Earns \$555,554

CHICAGO, June 12—The Pines Win-terfront Co. reports net earnings for the year ended April 30 after all charges of \$555,554. This is equivalent to \$1.82 a share on outstanding stock and compares with earnings of \$405,151 for the previous fiscal year.

A.C.C. Announces Export Division

NEW YORK, June 12—Foreseeing a large foreign market for American airplanes and aeronautical products, the Aeronautical Chamber of Commerce has organized an export division to study problems confronting manufacturers and to work with the Department of Commerce in stimulating the export market. John Schlegel, of the Fairchild Aviation Corp., is chairman of the export committee appointed by Frederick B. Rentschler, president of the aircraft industry's trade association. Mr. Schlegel has called a meeting of the committee for June 20.

Krohn Moves Manufacturing

DETROIT, June 12—The Krohn Differential Corp. of Chicago, has leased the manufacturing plant of the Campbell Co., at Buchanan, Mich., for the manufacture of Krohn compensating differentials for motor trucks and passenger cars and Krohn power dividing units for six-wheel trucks. Operations have already been started in the Buchanan plant, although production for the present also will be continued in the Chicago factory. Later the engineer department will be moved to the Michigan plant.

Ford Seeks Taxi Rights

NEW YORK, June 13—Application has been made by the Ford Motor Co., through its attorney, Delancey Nicoll, Jr., to supply a fleet of taxicabs for operation in the city of New York, according to an announcement by Grover C. Whalen, police commissioner of New York. The cabs as manufactured at present do not conform to New York regulations, Mr. Whalen pointed out.

Hudson Truck Named Dover

DETROIT, June 13—The Hudson Motor Car announced yesterday that its new $\frac{3}{4}$ -ton truck, to be introduced July 1, will be called the Dover.

Budd Mfg. Votes Increase in Stock

Income for Four Months
Exceeds That of All
Last Year

PHILADELPHIA, June 12—At a special meeting held today, stockholders of the Edward G. Budd Mfg. Co. voted to increase the authorized common stock of the company from 400,000 shares to 1,100,000 shares, of no par value common stock. Preferred stock will remain at the present figure of 200,000 shares of \$100 par value.

The company reports earnings for the first four months of 1929, before Federal taxes, of \$1,204,801, which, after allowing for Federal income taxes and other charges, including provision for dividend on the preferred stock, leaves earnings of \$0.83 per share for the increased common shares to be presently outstanding. This figure exceeds the net earnings figure for the whole year 1928 of \$1,014,731, which latter figure did not include a write-off of \$1,250,000 during the year for depreciation and development work.

Production of automobile doors by the company for the first four months of 1929 reached 860,000 units. This compares with 1,300,000 doors for the entire year 1928 and 1,100,000 for 1927.

Secretary Lamont Names Maintenance Committee

NEW YORK, June 12—A sub-committee on Maintenance of the Motor Vehicle affiliated with the National Conference on Street and Highway Traffic, consisting of eight members of the Motor and Equipment Association, has been appointed by Secretary of Commerce Lamont. A. V. Hall of Sherwood Hall Co., Ltd., Grand Rapids, who is chairman of the association's Committee on Safety and Traffic and who has been active in the National Conference since last December, heads this sub-committee.

Other members are N. H. Boynton, National Lamp Works, Cleveland, Ohio (president of the Motor and Equipment Association); W. J. Buettner, Bendix Corp., Chicago; A. C. Macy, Raybestos Co., Bridgeport, Conn.; M. A. Moynihan, Gemmer Mfg. Co., Detroit; John R. Oshei, Trico Products Corp., Buffalo, N. Y.; I. K. Schnaitter, Willard Storage Battery Co., Cleveland, Ohio, and A. C. Storz, Storz-Western Auto Supply Co., Omaha, Neb.

Brockway Motor Truck Adds Three Directors

NEW YORK, June 12—Brockway Motor Truck Corp. at its annual meeting yesterday voted to increase the number of directors from seven to 10 and elected J. Mitchell Hoyt, C. K. Woodbridge, C. M. Finney, Ernest Stauffen, Jr., and P. J. Ebbott to the

directorates. A. J. Buck and W. N. Brockway retired from the board.

Martin A. O'Mara, president, said: "Our sales during the first four months of 1929 have shown a gain of 40 per cent in units over the corresponding period of 1928."

Ford Engine Changed

DETROIT, June 11—A number of changes have been made in the Ford Model A engine recently to reduce its oil consumption. The pistons are now fitted with one oil scraper ring each, in addition to two compression rings, all of the rings being located above the piston pin. At the bottom of the ring groove for the scraper ring a number of holes are drilled through the piston wall, through which oil scraped off the cylinder walls by the oil-control ring can return to the crankcase. The point of connection of the oil return pipe to the valve housing cover has been lowered, so that the oil is now carried in the valve housing at a lower level.

William G. Mercer

DETROIT, June 13—William G. Mercer, aged 52 years, vice-president and general manager of the Kelvinator Corp., died at his home in Detroit June 10 following a brief illness. Mr. Mercer was assistant treasurer of the old Marquette Motors, Inc., a division of General Motors. In 1913 he was associated with A. H. Goss in the purchase of the Detroit Demountable Rim Co., which was reincorporated as the Detroit Carrier & Mfg. Co.

Import Ruling Made

WASHINGTON, June 13—Tractors of foreign manufacture may be imported to the United States duty free, the Treasury Department ruled this week. The question arose in the Port of New York when an attempt was made to collect duty upon Fordson tractor parts manufactured in Ireland.

Gramm Forms Sales Unit

TOLEDO, June 12—The Gramm Motor Truck Sales Corp., capitalized at \$100,000, was incorporated here today by Seeley and Wolfe, attorneys, to take over almost the entire output of Gramm Motors, Inc., which has its truck manufacturing plant at Delphos, Ohio, for distribution from this city. B. A. Gramm is president of the new company.

Kantlink in Demand

MASSILLON, OHIO, June 12—Over 80 per cent of the output of the Reliance Mfg. Co. of Massillon, and the Mansfield Lock Washer Co. of Mansfield, Ohio, now consists of the new Kantlink washer. This is a patented spring lock washer.

Essex Prices Increased

DETROIT, June 12—The Hudson Motor Car Co. has increased the prices on the Essex coach and phaeton from \$695 to \$735 each.

M.&E.A. to Conduct Series of Meetings

Plan is Under Way for De-
veloping Regional
Activities

NEW YORK, June 11—Immediate inauguration of the plan for developing regional activities among wholesaler members of the Motor & Equipment Association, drafted at a recent meeting in Chicago of the councillors of the wholesale group, will be undertaken this month.

The first of these meetings will be held in Chicago June 17 and 18 for wholesalers in the Chicago territory, and will be followed by two-day conferences in seven other zones. As a result of these meetings, which are to be completed by Aug. 1, it is expected that the association will organize a staff of workers definitely assigned to the work of this division, which will be headed by B. W. Ruark, assistant managing director, operating under the general direction of M. L. Heminway, managing director, and in cooperation with the Sales Development Department, managed by Neal G. Adair.

The association's annual business exhibit to be held in Chicago Nov. 4 to 9 is to be strictly a members' show, according to announcement from headquarters of the association today. Manufacturers of Division B, selling through the wholesale trade, will comprise the exhibitors and the visiting attendance will be confined to members of Division C, the wholesale members. The show will be held at the Coliseum simultaneously with the annual convention of the M. & E. A.

Pump Firm Changes Name; Constructing New Plant

CHICAGO, June 12—The Milwaukee Circulating Pump & Mfg. Co. of Milwaukee, has changed its name to the Hein-Werner Motor Parts Corp., it is announced. A new factory 175 by 350 ft. is now under construction at Waukesha, Wis. The company expects to enter the new quarters on or about Sept. 15. It will specialize in oil and water pumps to engine manufacturers' specifications, special cut gears and screw machine products. Active officers of the Milwaukee Circulating Pump & Mfg. Co. will remain in charge of the affairs of the new corporation.

Willys Meeting Closes

TOLEDO, June 13—More than 150 zone managers for both Whippet and Willys-Knight lines of automobiles concluded their three-day convention at the factory here today. The sales outlook for the Willys-Overland Co. in the next few months was reported very favorable by the zone and regional officials.

Fischer & Jacobs Enter New Project

Air Craft Engine Corp. is
Organized Under Laws of
Pennsylvania

PHILADELPHIA, June 11—The Air Craft Engine Corp. was granted a charter by the Department of State of the Commonwealth of Pennsylvania, June 5. Henry M. McFadgen, vice-president of Fischer & Jacobs, Inc., airplane engine manufacturers, Philadelphia; Albert R. Jacobs, secretary and treasurer of the same company, and Robert Glendinning, Jr., of Robert Glendinning & Co., bankers, appear as the incorporators.

An engine designed by Messrs. Jacobs and McFadgen, which is undergoing Department of Commerce tests for an approved type certificate, will be manufactured by the new corporation. Experiments perfecting the new engine and the assembly for testing were manufactured in the Fischer & Jacobs plant.

It is understood that with the formation of the new company Fischer & Jacobs, Inc., will withdraw from business as an operating company, but retain a block of stock in Air Craft Engine Corp. Financial organization of the new company has not been completed but details are expected to be announced within a few days.

Detroit Firm Becomes Letts Drop Forge, Inc.

DETROIT, June 11—Detroit Socket Co. will in the future operate under the name of Letts Drop Forge, Inc. The company has been celebrating its 20th anniversary, having opened for business June 9, 1909.

C. E. Letts, who is president and general manager, joined the sales department in 1914 and in 1915 became sales manager. In 1917, he was elected president and general manager. Mrs. Irene Letts, vice-president, is probably the only woman officer of a drop forging concern in the country. M. D. Holcomb directs the technical and production end. H. A. Rebb, who for 18 years has been connected with the Kelsey-Hayes Wheel Corp., will take charge of the sales department June 1.

Ford Preparing Factory at Constantinople Site

DETROIT, June 12—The Ford Motor Co. will have its assembly plant in Constantinople in operation before the end of the year, it is announced. Ford executives from the Dearborn offices are now in Constantinople cooperating with representatives of the Ford Motor Co., Exports, Inc., in preparation for the new plant. Seventy-five cars a day will be the capacity of the factory.

The site is leased from the Serai-Sefain, a steamship company, and is to be remodeled and reconstructed. The plant will be modern in every respect,

and will be equipped with conveyor lines, enamel ovens and chassis assembly lines. Upon completion of the factory, arrangements will be made to discontinue the service plant in Alexandria, Egypt, which up to the present time has been servicing Ford dealers in the Near East.

Form Cartel for Abrasives

NEW YORK, June 11—Durex Abrasives Corp. has been organized to include the sanding abrasives export business of American Glue Co., Armour and Co., Baeder-Adamson Co., H. H. Barton and Sons Co., Behr-Manning Corp., The Carborundum Co., Minnesota Mining and Mfg. Co., United States Sandpaper Co., and the Wausau Abrasives Co. Production of these companies is said to represent over 95 per cent of the American sandpaper industry. Head office of the new corporation will be located in Jersey City with an operating office in New York.

World Registration Fixed

WASHINGTON, June 13—The total world registration of motor vehicles on Dec. 31, 1928, was 32,028,584, according to a report just issued by the Automotive Division, Department of Commerce. The total was made up of 27,007,965 passenger cars, 4,702,950 trucks and 317,669 buses. Total world motorcycles in use were 2,262,932. Allowing for the errors which are present in all motor vehicle registration tabulations, the total and detail figures just published by the department are in close agreement with those published in the Statistical Issue of *Automotive Industries*, Feb. 23, 1929.

To Pool Plane Orders

WASHINGTON, June 13—According to a Paris dispatch received this week by the Department of Commerce, the Aero Club of France has formed a purchasing corporation for the purpose of pooling orders with a view to obtaining inexpensive planes and encouraging tourist travel by air. By pooling orders, it is believed the airplane industry will be able, through quantity production, to produce an inexpensive type of plane. The movement has the endorsement of the Air Ministry, it was stated.

Moto-Meter Announces Plans

NEW YORK, June 12—The Moto-Meter Gauge and Equipment Corp., recently organized for the consolidation of the Moto-Meter Co. and the Safe-T-Stat Co., will have three main domestic plants—one at Long Island City, N. Y., one at La Crosse, Wis., and one at Toledo, Ohio, and two foreign plants—one at Toronto, Ont., and one in Germany.

Plane Firm Changes Name

TROY, OHIO, June 11—The Advance Aircraft Co., makers of "Waco" airplanes, announces that it has changed its name to Waco Aircraft Co.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, June 13—The cool and wet weather in some sections of the country last week again retarded trade and delayed the progress of the crops. Nevertheless, although there is some weakness in a few lines, industry continues above last year's levels. The agreement of the Experts' Committee on the Young Plan of reparation payments has brought confidence to the business communities throughout the world, and it is generally expected that further economic recovery of many European countries will follow.

OIL PRODUCTION

Average daily crude oil production for the week ended June 1 was 2,711,650 bbl., as compared with 2,690,350 bbl. for the week before and 2,365,400 bbl. for the corresponding week last year.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended May 25 totaled 1,061,416 cars, which marks an increase of 15,237 cars over those in the preceding week and 40,013 cars over those in the corresponding week last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended June 8 stood at 95.8, and compares with 95.6 the week before and 95.9 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended June 5 were 8 per cent below those in the similar week last year.

STOCK MARKET

The stock market last week reversed its course from the downward trend that was manifested during most of May. There was some weakness evident, but the general tone was strong and toward higher levels. A good portion of the previous losses was recovered, the largest net gains for the week being in public utility issues. Brokers' loans in New York City for the week ended June 5 decreased \$4,000,000. This reduction followed a decrease of \$232,000,000 the week before and \$45,000,000 two weeks before.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended June 5 showed decreases of \$10,800,000 in holdings of discounted bills and of \$5,200,000 in holdings of bills bought in the open market. There were increases of \$2,800,000 in holdings of government securities and of \$35,500,000 in member bank reserve deposits. The Reserve ratio on June 5 was 74.4 per cent, as against 74.5 per cent a week earlier.

Decline in Steel Proves Gradual

Few Postponements Noted as
Consumers Specify Against
Previous Contracts

NEW YORK, June 13—Publication on Monday of the leading steel concern's unfilled tonnage statement disclosing a decrease of only 123,596 tons in its backlog, fully corroborated the general impression that the recession in buying has been very slight so far. With a new high production record established in May—1,600,000 tons, an increase of 175,000 tons over April—the decrease must be charged more to that factor than to any marked let-up in new business which, it is estimated, aggregated 1,475,000 tons.

Compared with some of the higher unfilled tonnage reports for May of six and seven years ago, it is pointed out that the business now on the corporation's books is virtually irrevocable whereas the figures of the earlier years represented a maximum of buyers anticipated requirements which was always more or less subject to cancellations, the buyer simply forgetting to furnish specifications when it so suited him.

In only a very few cases have steel buyers asked postponement of shipments of late, and although pressure on mills' furnishing facilities has given way to easier conditions, consumers specify liberally against previously placed contracts. Most of the large sheet rollers have sufficient business on their books to carry them comfortably through the remainder of June and through July during which a certain loss in production as the result of hot weather must be expected.

An authority states that the automotive industries have of late been taking 35 per cent of the total sheet production, 66 2/3 per cent of the total output of strip-steel, and between 25 and 30 per cent of the total merchant bar tonnage. Nothing new has developed with reference to the third-quarter market for semi-finished material, but non-integrated rollers appear confident that the threatened bulge in prices will not materialize.

Pig Iron—The pig iron market generally has turned quiet, the principal demand being for small lots. A few carloads of malleable are reported to have been sold at \$19, Valley furnace. The Michigan market is unchanged.

Aluminum—There is a revival of gossip emanating from Washington that the rates of duty on aluminum may be revamped when the Finance Committee of the Senate gets down to the metal schedule of the proposed tariff. At the beginning of May there were approximately 4,500,000 lb. in bonded warehouses, as compared with 12,500,000 lb. at the beginning of the year. The market is entirely unchanged, with the demand for remelt metal fair.

Copper—A somewhat more bullish sentiment is making itself felt, although domestic consumers appear in no hurry to cover

Move Under Way for Holland Roads

WASHINGTON, June 13—An active campaign in the Netherlands for the construction of "through" automobile roads is being waged by the Association for Fast Motor Roads of that country, it was announced at the Department of Commerce here this week.

their third quarter requirements. Some dealers are buying in the hope of consumers overdoing their aloofness from the market, and later being compelled to pay advances. With all of the activity on the National Metal Exchange, it is recognized that the producers still completely dominate the market.

Tin—The market has turned strong and active with prices tending upwards. Reports as to whether or not Dutch and Bolivian producers are willing to join the proposed Cartel are conflicting.

Lead—Although here and there storage battery manufacturers have bought round lots, the market continues to wear a routine character with the price steady.

Zinc—Considerable improvement in the market's tone is noted, and consumers have turned active buyers.

Keasbey & Mattison Co.

Has New Brake Lining

AMBLER, PA., June 11—The Keasbey & Mattison Co., of this city, which manufactures automobile brake lining under the trade name of "Ambler Autobestos," is announcing a brake lining especially designed for internal expanding brakes. The company explains that this lining has a very low coefficient of friction, is very closely woven and is made exact as to size. The material, said to work equally well on external brakes, is claimed by the company to be superior to molded linings.

Blue lettering distinguishes the new product from the former "Ambler Autobestos" for external brakes. Although fairly rigid and compact, it can be bent sufficiently to enable jobbers to stock it in rolls, thus reducing the number of varieties necessary in molded linings. Twenty rolls will take care of all makes of cars, it is explained.

Federal Has Model 4-C-6

DETROIT, MICH., June 12—The Federal Motor Truck Co. now fits its 4-ton six-cylinder truck with four-wheel hydraulic brakes and a Westinghouse vacuum amplifier. The new model, which supersedes the 3-C-6, is known as the 4-C-6.

Firestone-Ford Rumor Denied

AKRON, June 12—Officials of the Firestone Tire & Rubber Co., today made known that newspaper reports to effect that Firestone would supervise a huge plant to be erected by the Ford Motor Co. near its River Rouge works were incorrect.

Moskovics Heads Financing Concern

Former Stutz Head is Named
President of New York
Organization

NEW YORK, June 11—F. E. Moskovics, former president of the Stutz Motor Car Co., has been elected president of Improved Products Corp., an intermediate financing organization, it was announced here today. Hayden, Stone & Co., and Theodore Schulze and Co. are interested in the enterprise, according to the announcement.

Mr. Moskovics retired as president of the Stutz Motor Car Co. at a director's meeting held Jan. 24, ending a long and prominent association with the automobile industry.

Previous to his Stutz connection he was vice-president in charge of sales and promotion of the Nordyke and Marmon Co., with which he became associated in 1914.

For a number of years Mr. Moskovics has been prominent in the activities of the

Society of Automotive Engineers, serving as chairman of its Constitution Committee. He is also a member of the National Technical Committee of the American Automobile Association. He will make his residence in New York City.



F. E. Moskovics

Industrial Tire Sizes Set by Standards Group

WASHINGTON, June 13—Manufacturers, distributors and users of industrial truck tires agreed upon a reduction in the number of sizes of tires at a conference held here last week under the auspices of the Simplified Practice Division of the Bureau of Standards.

If accepted by firms using 80 per cent of the total output of truck tires, the recommendations in the report will become effective. The recommendations would become effective as of Sept. 1, 1929, and one year from that date another meeting of a representative committee would meet to consider changes in the recommendations.

Cessna to Enter New Plant

WICHITA, KAN., June 12—Clyde V. Cessna, president of the Cessna Aircraft Co., announced today that the company will occupy its new plant, consisting of eight buildings and costing a total of \$150,000, within a few days. Production at the rate of three planes daily will be maintained to supply Curtiss Flying Service, Inc., according to contract.

Men of the Industry and What They Are Doing

Joseph B. Graham Speaks on Used Car Marketing

Joseph B. Graham, president of the Graham-Paige Motors Corp., emphasized possibilities of the future development of used car markets in speaking at the first anniversary luncheon of W. E. Biggers, Inc., Graham-Paige Buffalo agency, recently. Sufficient study of the problem of marketing cars of this class has not yet been made, Mr. Graham said.

"I think that in a couple of years we will find that the market has materially increased," the manufacturer predicted. "In many of the large cities today, the working man requires an automobile to hold a job. The used car offers him an opportunity to buy transportation for as little as \$25, \$75 or \$150. There is now opening up an export demand for used cars, also."

Smith Leaves Hayes

Hal H. Smith, who has been associated with the Hayes Body Corp. since its beginning, has resigned as vice-president and director. Frank W. Blair, for many years a Hayes director, retired from the board at the corporation's annual meeting. It is understood that both Mr. Smith and Mr. Blair have disposed of their stock holdings to New York and Pittsburgh interests. F. W. Hutchings, associated with Messrs. Smith and Blair, has resigned from the Hayes organization, effective July 15.

Whittelsey Names Butts

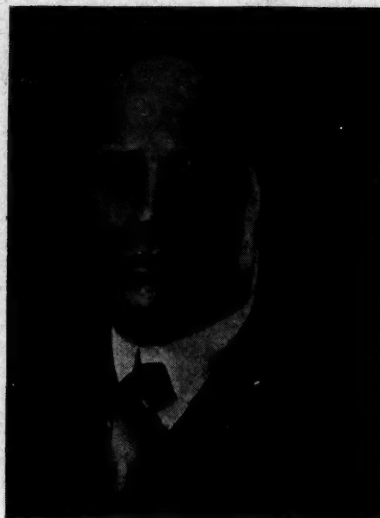
Edward Butts, Jr., formerly a pilot in the A.E.F., has been appointed sales manager of the Whittelsey Mfg. Co., holders of American rights for the manufacture of the British Avro Avian. He has perfected a national sales organization and established distribution points which will absorb the entire 1000 planes scheduled to be built before July 1, 1930.

Chapin Sails for Europe

Roy D. Chapin, chairman of the board of Hudson Motor Car Co. and former president of the National Automobile Chamber of Commerce, sailed last week, immediately following the annual meeting of the Chamber, for London where he will attend the regular meeting of the Bureau Permanent International de Constructeurs d'Automobiles on June 28.

Zummach Leaves Husky

J. G. Zummach, vice-president and general manager of the Husky Corp., Kenosha, Wis., maker of socket wrenches, has announced that he has sold his holdings and resigned his position. Mr. Zummach organized the Husky Wrench Co. of Milwaukee in 1924, holding the



Alvan Macauley

President of the Packard Motor Car Co., who was reelected president of the National Automobile Chamber of Commerce last week

position of president and treasurer. He plans a motor trip with his family to the Rio Grande Valley, Texas, where he is interested in citrus groves.

Highway Trailer Names Jahn

The Highway Trailer Co., Edgerton, Wis., has announced the appointment of Charles R. Jahn as sales manager of its commercial sales division. Mr. Jahn has been in the automotive field for 26 years. Recently he was branch manager for Highway Trailer at Minneapolis.

Rickenbacker Visiting Coast

Capt. E. V. Rickenbacker, assistant sales manager of the Cadillac Motor Car Co., left Wednesday of this week for an airplane trip to California, expecting to return to Detroit in ten days.

Grinnel Succeeds Conn

Ernest D. Grinnel has been appointed traffic director of the Buick Motor Co., to succeed George C. Conn, whose resignation becomes effective July 1. Mr. Grinnel has been assistant to Mr. Conn.

Ford to Honor Edison

Plans are in progress for reenacting the scene of Thomas A. Edison's first demonstration of the incandescent light on the fiftieth anniversary of the event, at Dearborn, Mich., Oct. 21.

N.A.C.C. Fetes England

Eric C. G. England, president of the Motor Agents Association of Great Britain, was given a luncheon by the National Automobile Chamber of Commerce at the Transportation Club, New York City, a few days ago.

Oakland Makes Changes in Personnel of Plant

Gordon Lefebvre, vice-president of the Oakland Motor Car Co., in charge of production, has announced the following changes in production personnel: M. H. Mathewson, formerly superintendent of the sheet metal shop, has been made assistant to Wayne Eddy, general production superintendent. A. B. Withington has been named superintendent of axles and transmission to succeed C. A. Ostling.

M. S. MacCauley has been made head of the paint and trimming department and retains his post as superintendent of plating and polishing. R. B. Smith has been appointed special assistant to Mr. Mathewson and Fred Zobel has been made assistant chief inspector.

Stone Leaves Goodyear

Clifford F. Stone has resigned as vice-president of the Goodyear Tire & Rubber Co. to join the Central States Electric Corp., of New York. Mr. Stone was with the Goodyear company eight years. A part of his duties have been taken over by Fred A. Harpham, of Akron. The board of directors will choose Mr. Stone's successor at its meeting June 17 and reports in rubber circle place Mr. Harpham in line for this post.

Detroit Firm Elects Officers

Stockholders of Detroit Electric Co. at the annual meeting elected the following officers: Harry A. Abrahamson, president; John J. Wood, vice-president, and Raymond A. Abrahamson, secretary and treasurer. Directors elected include the officers and Cornelius J. Lynch and Gerson Cass.

Link to Visit Orient

Robert J. Link will leave Detroit June 17 as special representative of the export division of Durant Motors, Inc., for an 18 months' trip through the Orient, including India, the Philippines, Burma, Siam and the Dutch East Indies.

Hayes Body Appoints Bare

Erwin L. Bare has been appointed production engineer for the Hayes Body Corp. For the last three years Mr. Bare was production engineer for the Murray Corp., after having been assistant chief engineer for two years.

Buckalew Directs New Plant

F. K. Buckalew is superintendent of the new Linde oxygen producing plant which commenced operations in Oklahoma City recently. A. B. Curtis, with headquarters at Dallas, Tex., is district superintendent.

Heater Companies Unite for Growth

Hook Heads Metalcraft Heater Corp., Formed for Expansion

DETROIT, June 12—The Grand Rapids Metalcraft Corp. has under way an expansion program which is expected to triple the business of its heater division, according to R. W. Hook, president. Under the plan a new corporation has been formed, known as the Metalcraft Heater Corp., the business of the Bovey Automobile Co. has been purchased, and a new hot-water type heater for automobiles in the lower price field has been developed. All of these heaters, as well as the Kelch Ventilating Heater, will be manufactured and sold through the Metalcraft Heater Corp., which will operate as a subsidiary of the Grand Rapids Metalcraft Corp. The new corporation has obtained a modern two-story building in Grand Rapids, Mich., to house its business.

In accordance with the policy of the Grand Rapids Metalcraft that each division must be self-financed and self-supporting, the new Metalcraft Heater Corp. was formed with 82,500 shares of no par stock, all owned by the Grand Rapids Metalcraft Corp. Stockholders of Grand Rapids Metalcraft are given rights to subscribe for stock of the Metalcraft Heater Corp. at \$4 per share on the basis of one share for each two shares of Grand Rapids Metalcraft owned on May 24. This applies to stockholders of record on the books of the company as of the close of business on May 24. These rights expire on June 7. It is expected that the stock will be listed later on the Detroit Stock Exchange and on the Chicago Curb Market.

Officers of the Metalcraft Heater Corp. are: president, R. W. Hook; vice-president, J. W. Kelch, president, J. W. Kelch Co., Detroit; vice-president, David A. Warner, vice-president, E. H. Rollins & Son, bankers; secretary, Edgar H. Johnson, Travis, Johnson & Judd, attorneys; treasurer, Dudley E. Walters, president, Grand Rapids National Bank; production manager, H. J. Ackerman, formerly production manager C. G. Bumper Corp.; sales manager, J. V. Harding, formerly sales manager Bovey Heater Co.; chief engineer, E. L. Knapp, formerly heater engineer Grand Rapids Metalcraft Corp.

New Aviation Company is Formed by Leopold

NEW YORK, June 10—Allied Aviation Equipment Corp., having a capital of 1,000,000 shares of no par stock, has been organized by Joseph Leopold, president of the Consolidated Instrument Co. of America, Inc. The new corporation will acquire a number of aviation parts and accessory manufac-

turing companies and will act as a holding company for Consolidated and a group of other companies of its class.

Consolidated has received orders from the Government for about \$80,000 during this year for instruments for military planes, such as tachometers, air speed indicators, compasses, altimeters, gasoline gages, manometers, propeller blade protractors and radio antenna reels. This company has also received orders for instrument equipment for installation on over 6000 commercial aircraft of various types.

Budd Wheel Authorizes Common Stock Increase

PHILADELPHIA, June 10—Stockholders of the Budd Wheel Co., have authorized an increase in the common stock of the company from 300,000 shares to 1,000,000 shares, as recommended by the board of directors at a meeting March 12.

Earnings of the company for the first four months of the year, after depreciation, and all other charges, amounted to \$757,891.35 which, after providing for preferred dividends for the period, amounted to \$3.23 per share on the common stock.

Canadian Exports Increase

OTTAWA, June 11—Exports of automotive vehicles from Canada during the month of April showed a substantial increase over the same month of last year, according to Canadian Government reports. The value of exported cars for April, 1929, was approximately \$3,000,000, as compared with the valuation of \$1,850,000 for April of last year. Argentina took the greatest number of passenger cars valued at \$500 or less, while Spain purchased the greatest number of commercial vehicles from the Dominion.

Durant, Ltd., Sales Up

OTTAWA, ONT., June 11—Production figures issued by Durant Motors of Canada, Ltd., Leaside, Ontario, show an increase in domestic sales for the first five months of the current year of 20.8 per cent over the corresponding period of 1928.

Champion Awards Contract

DETROIT, June 10—The Champion Spark Plug Co. has awarded a contract to the John B. Gray Construction Co. for the \$150,000 addition to its Windsor plant, plans for which were announced in *Automotive Industries* recently.

G.M. Holders Are 125,165

NEW YORK, June 11—The General Motors Corp. has reported that stockholders for the second quarter of 1929, number 125,165, as compared with 104,202 for the first quarter.

Franklin Expands Sales Map
SYRACUSE, N. Y., June 11—The Franklin Automobile Co. announces that 96 new retail points have been added to its sales map since January.

Financial Notes

Commercial Credit Co. stockholders will meet at Baltimore June 17 to consider the directors' recent proposal to create an issue of 1,000,000 shares of Class A convertible stock and to increase the authorized issue of common stock from 1,200,000 to 3,000,000 shares of no par value. The greater portion of this authorized increase would be to provide for conversion of Class A convertible into common stock. It is proposed also, to authorize the board of directors from time to time to issue all or any part of the shares of Class A convertible and/or common stock without first offering said shares to the holders of common stock.

Sparta Foundry Co. has declared an initial quarterly dividend of 75 cents per share and an extra dividend of 25 cents per share on common stock, both payable June 30 to stockholders of record June 15. This action places the common stock on an annual dividend basis of \$3 per share. Application has been made to list this stock on the Chicago Curb exchange. Financing of the company was recently carried out here and in other financial centers by a public offering of 22,500 shares of common by a syndicate headed by A. W. Clutter & Co., of Chicago, New York and Grand Rapids.

Tide Water Associated Oil Co. will offer stockholders of Tide Water Oil Co. common the right to exchange their stock in the Associated company on the basis of 1½ shares of the latter for each share of Tide Water Oil Co.

Hupp Motor Car Corp. declared the regular quarterly cash dividend of 50 cents, payable August 1 to stock of record July 15. The quarterly stock dividend of 2½ per cent declared in January, 1929, is also payable August 1 to stock of record July 15.

Pratt & Lambert, Inc., maker of varnish, enamel and lacquer, has declared a dividend of \$1 a share on its no par value common stock, payable July 1 on stock of record June 15.

Timken-Detroit Axle Co. announces its regular quarterly dividend of 15 cents, and an extra 5 cents will be paid on the common stock July 1 to stock of record June 20.

General Foundry & Machine Co. has declared the regular quarterly dividend of 56 cents on the Class A stock, payable June 30 to stock of record June 20.

Riverside Forge & Machine Co. has declared the regular quarterly dividend of 60 cents on the common stock, payable July 25 to stock of record July 25.

Federal Screw Works have declared a regular quarterly dividend of 75 cents a share, payable July 1 to stock of record June 20.

Briggs & Stratton Corp. has declared an initial dividend of 50 cents a share, payable July 1 to stockholders of record June 20.

Mack Trucks, Inc., has declared regular quarterly dividend of \$1.50 payable June 29 to stockholders of record June 15.

Oldsmobile to Build Service Parts Dept., Tenth Addition to Plant in Two Years

DETROIT, June 10—The Olds Motor Works will build another large addition to its factory at Lansing, Mich., according to I. J. Reuter, president and general manager. This is the tenth large structure started by the company in the past two years. The new building, three stories in height, will contain 169,300 square feet of floor space, and will be utilized for the service parts department.

About one-third of the first floor will be used for a past model machine shop. Jigs, dies, tools and machinery for the manufacture of any part of any model Oldsmobile produced for the past twenty years or more will be located here. The first floor will also house a service research department of the technical division of the service, parts activities, the box factory, receiving room, elevator and storage.

A feature of the second floor will be a most modern small parts storage department completely equipped with metal bins. Small parts contained in the present Oldsmobile sixes and the Viking eights, as well as models of Oldsmobiles produced in recent years, will be carried in stock. A division of this department will be devoted to stocking unit packages of small parts

which dealers order in quantity. These small parts are packed in containers containing standard quantities so that they are ready for instant shipment on receipt of an order. Other activities on the second floor will include the shipping department and parts deliveries to nearby dealers who come to Lansing for driveaways.

Offices of the parts division of the service department and the tabulating division will occupy the east portion of the third floor. Bulky parts, such as radiators, running boards and sheet metal parts, will be stocked on the third floor.

Another innovation will be the installation of a pyroxylin paint department. This will be used to finish fenders and other sheet metal parts ordered for replacements on de luxe models. In the future these parts will be carried unfinished and lacquered and shipped as orders are received.

A portion of the third floor will be used as a service school for the training of dealer service men in the Great Lakes region. The building also will be equipped with a conveyor system to handle all parts, from the storage departments to the shipping room.

Studebaker is Offering Bus of 220-in. Wheelbase

SOUTH BEND, June 12—The Studebaker Corp. is placing on the market a new inter-city 25 passenger bus, built on a straight eight chassis of 220-in. wheelbase. This will supplement the 158-in. and 181-in. chassis which also are powered by the President eight 115 horsepower motor.

Commercial car sales for the first four months of the year have shown an increase of 42 per cent. over the same period of 1928, according to C. R. Wondries, manager of the commercial car division. This increase is attributed mainly to the introduction of the straight eight powered buses.

AC Sales Increase

FLINT, MICH., June 12—Sale of AC spark plugs to distributors for the first quarter increased more than 1,500,000 over the corresponding period of last year, according to W. S. Isherwood, AC general sales manager. AC oil filter cartridge sales to distributors were more than 240,000 during the quarter, a substantial increase, Mr. Isherwood added.

Crude Rubber Quiet

NEW YORK, July 10—Crude rubber experienced a quiet week, as far as trading was concerned, last week, according to F. R. Henderson Corp. Prices fluctuated but little with a tendency toward the heavy side. Stocks in

London were increased to 31,539 tons while arrivals at all ports of the United States for the first week of June are estimated at 6100 tons. Preliminary estimates for the month's arrival are 41,000 to 42,000 tons.

Sky Specialties Corp. Unites Aircraft Firms

DETROIT, June 11—Stockholders of Heywood Starter Corp. and Simon Airplane Appliance Co. have approved consolidation, forming a new company to be known as the Sky Specialties Corp., with 200,000 shares no par capital stock authorized, of which 125,303 shares will be outstanding.

Heywood Starter has 65,303 shares and Simon Airplane Appliance 60,000, which will be exchanged for stock in the new company on a share for share basis.

Officers and directors of the new company will include Arthur L. Cash, president; F. L. Riggan, vice-president; S. D. DenUyl, secretary and treasurer; and Charles B. Bohn, William B. Stout, Stanley E. Knauss, Edwards Roberts, S. L. McKay and John Collins, Jr.

Pioneer Marketing New Oil

NEW YORK, June 12—Pioneer Instrument Co. is placing on the market for general use in instruments requiring a wide temperature range its recently developed Wilkins oil, intended primarily for use in aircraft instruments. This oil was named after Capt.

Wilkins, the Arctic explorer, who tested it out on his last trip into the Antarctic. It retains its lubricating qualities through a temperature range of -40° to +50° C.

Car Exports to Mexico Show Decrease for May

LAREDO, TEX., June 10—Automobile exports to Mexico through the Laredo port of entry showed a decrease during May as compared with the preceding month. The total number for May was 1150 and for April the number was 1814. The orders which are now being filled are for the cheaper types of cars. It is stated by dealers in Mexico that prospects are favorable for an unusually good trade in the higher priced cars when business conditions of the country become more stabilized.

Not many new stretches of improved roads will be made available for automobile traffic during the present year. The Mexican Government was hard hit financially by the recent revolution, and the revenues from the gasoline sales tax which were heretofore devoted to road construction will be diverted temporarily to other uses, according to official announcement.

Aviation Corp. Prepares New Cross-Country Route

NEW YORK, June 10—The Aviation Corp. will inaugurate trans-continental air service this month in cooperation with the New York Central and the Atchison, Topeka and Santa Fe Railroads.

The route includes rail transportation from New York and Boston over the New York Central over night to Cleveland, thence in a 14-cabin Fokker monoplane to Garden City, Kans., with stops for luncheon and refreshments at Chicago and Kansas City. At Garden City, passengers will board the California Limited of the Santa Fe, bringing them to Los Angeles or San Diego on the morning of the fourth day, thus requiring three nights and two business days.

Rim Output Totals 2,574,224

CLEVELAND, June 12—The total rim production in May was 2,574,224, compared with 2,729,899 in April and 2,185,592 in May, 1928, according to the statement of rims approved by the Tire and Rim Association of America, Inc. The total of the first five months of 1929 was 12,017,743, compared with 10,544,586 in the corresponding period last year.

Navy Places Order

WASHINGTON, June 11—An order for 25 engines has just been placed with the Pratt & Whitney Aircraft Co., of Hartford, Conn., the Navy Department has announced. The engines are to be used in the construction of planes, an order for which was placed last week with the Glenn L. Martin Co., the Department announces.

Automotive Demand for Lumber Drops

Total Sales to Car Industry
Appear High, Despite
Decline

ATLANTA, June 12—According to lumber manufacturers and wholesalers in this district, the seasonal decline in the volume of new orders for southern hardwoods from the automobile and body manufacturers has been steady during the past two weeks, with several of the buyers not in the market at all for the present, and orders from those that are buying of relatively small size. There are few orders at present for deferred shipment to cover needs during the next few months, although some orders of this kind were placed in May by larger concerns for their third-quarter needs.

Despite the decline, however, the total volume of this business continues to be in excess of that for the corresponding period last year, and there is little or no doubt but that, when figures are available covering southern hardwood sales to the automotive industry for the first half of 1929, they will prove the largest in the history of the industry for that period, exceeding the first six months of last year by at least 25 to 30 per cent.

Lumbermen also state that there has been a decline in the volume of inquiries from the automotive industry since the last of May, and that while better business than last year is in prospect for the next several weeks, there is little likelihood that sales will be as heavy as they were the early part of the year. Prices are holding to firm levels, with mill yard stocks of woods used by this industry at a rather low ebb, and dry lumber especially hard to obtain for immediate shipment.

Colors Gain Popularity

PARIS, June 8—P. H. Chase, manager of the Du Pont Style Service, 6 Rue Christophe-Colomb, Paris, who recently visited the Vienna Automobile Show, reports that the color treatments of the automobiles originating in America are now finding their way into central Europe. "The western countries of Europe, and more especially France, adopted these ideas more than a year ago, but it is only now that they are receiving their first application in Germany and Austria and this in a somewhat timid manner," said Mr. Chase.

G.M. Men Visit Michigan

DETROIT, June 8—A large party of executives of the General Motors Export Co. were in Michigan this week visiting various General Motors factories. The party came here following a nine days' conference in the East, and they visited General Motors plants in Detroit, Flint, Pontiac and Lansing.

Week of Five Days Coming Into Favor

WASHINGTON, June 11—Rapid strides are being made toward a five-day week in the automobile and other major industries, according to an economic survey just completed by the Department of Labor. Figures compiled by the department show that during 1928 approximately 30 per cent of all automobile, accessory and tire manufacturers had in force the five-day week. In 1925 but 1.5 per cent of automobile manufacturers' employees were working a regular five-day week.

The party also visited General Motors of Canada, Ltd., at Oshawa, Ont. Many of the executives will remain in New York several weeks before returning to their posts.

Auto-Lite Obtains Land for Its Future Growth

TOLEDO, June 12—The Electric Auto-Lite Co. has announced the purchase of 400 ft. of property just south of its present plant with frontage on Wheeling & Lake Erie Railroad at a cost of \$200,000 and will hold the space for future development. Recently similar purchases north of the plant were made, and now the company controls 2800 ft. of frontage with an average depth to the railroad tracks of 200 ft.

The recent purchase included the plant of the Universal Glove Co., gas station, two stores and five residences, all of which will remain as tenants for the present. C. O. Miniger, president, controls considerable investment real estate in Toledo and is now building a nine-story apartment hotel structure here.

Toledo Employment 42,000

TOLEDO, June 12—Employment in Toledo automotive plants has shown a seasonal tendency downward in the last four weeks and there are now about 42,000 workers in 51 plants compared with 41,400 a year ago.

Doyle Changes Plane Name

BALTIMORE, June 10—To eliminate confusion in the trade, the Doyle Aero Corp. of Baltimore, has announced that its two-place sport and training plane will hereafter be known as the "Doyle O-2" Monoplane.

Buys German Bearing Firm

BERLIN, June 6—The Swedish S.K.F.-Norma combine has just come in possession of Friess & Hoepflinger of Schweinfurt in Germany, one of the oldest makers of ball and roller bearings in the world.

Car Registrations Higher in Detroit

Total of 61,823 in Five Months
Nearly Double Last
Year's

DETROIT, June 12—A total of 20,512 new passenger cars were registered in Wayne County in May. This brings the total for the first five months to 61,823, or almost double the figure for the corresponding period of 1928, when 32,525 new passenger cars were sold in the first five months.

During last month 1452 new commercial cars were registered in Wayne County, bringing registrations of commercial vehicles for the first five months to 4773, compared with 2147 in the corresponding period of the previous year. Bus sales last month numbered 11, bringing the total to date to 27, compared with 9 of last year.

The first 10 sales leaders for passenger cars in Wayne County for the first five months of 1929 follow:

Make	Total	Total to Date, 1929	Total to Date, 1928
Ford	8,506	23,011	3,030
Chevrolet	3,510	10,324	7,763
Essex	2,314	7,325	4,451
Pontiac	894	3,091	2,560
Whippet	471	1,781	1,184
Buick	365	1,678	1,723
Hudson	468	1,577	754
Oldsmobile	436	1,569	899
Graham-Paige	437	1,461	1,163
Dodge	327	1,026	1,410

The first ten sales leaders for commercial cars in Wayne County for the first five months of 1929 follow:

Make	Total	Total to Date, 1929	Total to Date, 1928
Ford	796	2,549	546
Chevrolet	345	1,142	720
Dodge	49	223	198
G.M.C.	56	162	114
International	50	138	37
Reo	39	137	134
Federal	20	71	76
Fargo	18	55	0
Mack	20	48	52
White	8	40	26

Willys Exports Increase

TOLEDO, June 11—Willys-Overland Co. shipped 22,132 units abroad in the first five months compared with 15,309 cars in the same months last year, an increase of 44½ per cent. Officials of the company say that June will show same proportionate increase judging present specifications and the excellent results from the introduction of the new commercial units.

William J. Birmingham

DETROIT, June 12—William J. Birmingham, 53 years old, affiliated with the automotive industry almost since its inception, died June 9. Mr. Birmingham was vice-president of Stoddard-Loveley Co., an automobile accessory firm.

Graham-Paige Shows Huge Export Growth

DETROIT, June 15—The Graham-Paige Motors Corp. has announced its overseas shipments in May as 1235, bringing the total for the first five months of the year to 6262, more than three times the figure for the same period last year, and even exceeding the total of 6239 for the entire 12 months of 1928. According to officials of the company, Graham-Paige has risen to eighth place in the number of units sent to foreign countries—Canadian shipments not included—in little more than 12 months.

When the Graham-Paige was introduced at the beginning of last year, the company had only the nucleus of an overseas selling organization. It attributes the rapid expansion of its overseas dealers list to the established reputation of the three Graham brothers and to the popularity of its four-speed drive abroad.

The overseas marketing organization of the company now includes 122 distributors with dealer connections in 70 countries. These distributors take 13 per cent of the company's total production. Eighteen factory representatives maintain contact with the foreign distributors and dealers.

A.S.M.E. to Discuss Diesel

NEW YORK, June 11—Two sessions on high-speed Diesel engine design will occupy the first day of the summer meeting of the Oil and Gas Power Division of the American Society of Mechanical Engineers at the Pennsylvania State College, June 24-27. Charles L. Lawrence, president of the Wright Aeronautical Corp., and George W. Lewis, director of research of the

Survey in France Shows 1,088,351

PARIS, June 8—France had 1,088,351 automobiles in service at the end of 1928, according to returns issued by the government. The total was composed of 757,668 passenger cars and 330,683 trucks. The increase compared with the previous year is 111,705. Returns are not given by cities but by departments, the Seine district, which includes Paris, heading the list with 179,004 cars. The Nord department comes second with 43,719 automobiles.

National Advisory Committee on Aeronautics, will preside. Other sessions will deal with Diesel powerplant refinements, cost of Diesel power and marine operation, and fuel oil specifications and oil engine ratings. There will be a discussion of actual commercial applications, such as aircraft, automotive and small mobile power units.

Tire Exports Decline

WASHINGTON, June 11—Exports of automobile tires and casings from the United States during April totaled \$4,021,507, a decline of 18 per cent from the March exports, according to figures of the U. S. Department of Commerce. Eight countries, during April, took more than 10,000 casings. They were: Argentina, with 23,527 units; Denmark, 15,595; Brazil, Hawaii and Cuba, with 13,573, 13,486 and 13,099 units respectively; Java, 12,877; Germany, 11,671, and Belgium with 10,168 units.

Amsterdam Event Plans Announced

WASHINGTON, June 11—The Fifth Congress of the International Chamber of Commerce will be held in Amsterdam, beginning July 8, with delegates from twelve European countries and the United States, according to announcement just made by the United States Chamber here. Official delegates of the United States will number 140, the majority of whom will leave the United States on the S. S. Statendam on June 29.

Problems of international importance, insofar as they affect the automotive industry, will be laid before the International Chamber by four American delegates. They are: A. J. Brosseau, president of Mack Trucks, Inc., official delegate representing the U. S. Chamber; John N. Willys, president of the Willys-Overland Co.; Roy D. Chapin, chairman of the board of the Hudson Motor Co., and James D. Mooney, president of the General Motors Export Co.

Mr. Chapin will preside as Chairman of the International Highway Transport Committee, which will concern itself primarily with "Highway Finance" and "Rail and Motor Coordination." Other topics of international importance allied with the subject of transportation will also be discussed.

Lansing Forge Gets Refund

DETROIT, June 10—Abatement of \$20,738 and refund of \$5,506 to the Lansing Forge Co. of Lansing, Mich., for overassessment of income and profit taxes in 1919 and 1920 is announced by the Internal Revenue Bureau. Overassessment was due to erroneous inventories which had been overvalued, it was explained.

Calendar of Coming Events

SHOWS

International Aircraft Exhibition, Olympia, London July 16-27
International Aircraft Exhibit, Coliseum, Chicago Sept. 7-15
National Machine Tool Builders' Exposition and Congress, Cleveland, Sept. 30-Oct. 4
Paris, Automobiles Oct. 2-12
London, Automobiles Oct. 17-26
Prague, Automobiles Oct. 23-30
Paris, Motorcycles Oct. 23-Nov. 3
M.A.E. Show and Convention, Chicago Nov. 4-9
N.S.P.A. Show and Convention, Detroit Nov. 11-16
Berlin Auto Salon Nov. 14
London, Trucks Nov. 7-16
Paris, Trucks Nov. 14-24
London, Motorcycles Nov. 30-Dec. 7
Brussels Auto Salon Dec. 7
New York National Jan. 4-11
Chicago National, Coliseum Jan. 25-Feb. 1

CONVENTIONS

Joint Meeting, Oil and Gas Power Division of the American Society of Mechanical Engineers and Pennsylvania State College, State College, Pa. June 24-27
National Association of Credit Men, Minneapolis June 24-29
American Society Testing Materials, Annual Meeting, Atlantic City, June 24-28

Motor Bus Division, A.A.A., Third Annual Meeting, Buffalo July 1-2
American Automobile Association, Buffalo July 1-2
National Association of Show and Association Managers, Meeting, Chicago July 25-26
American Welding Society, Fall Meeting and Exposition, Cleveland Sept. 9-12
American Institute of Mining and Metallurgical Engineers, Cleveland, Sept. 9-12
American Society for Steel Treating, Convention and Exposition, Cleveland Sept. 9-13
American Chemical Society, Fall Meeting, Minneapolis Sept. 9-13
A.S.M.E.—Iron and Steel Division—National Meeting, Cleveland Sept. 11-13
Society for Electrical Development, New York City Sept. 13
Eastern States Exposition, Springfield, Mass. Sept. 15-21
American Electric Railway Association, Atlantic City Sept. 23-Oct. 4
National Safety Congress, Annual, Chicago Sept. 30-Oct. 4
Penn. Automotive Association, Erie, Pa. Oct. 7-8
Society of Industrial Engineers, Detroit Oct. 16-18
World Engineering Congress, Tokyo, Japan Oct. 29-Nov. 22
National Automobile Dealers Association, New York City Jan. 6
National Automotive Dealers Association, Chicago Jan. 27-28

RACES

Altoona, Pa. June 15
Rudge Whitworth Cup, Le Mans, June 16-17
Salem, N. H. June 29
French Grand Prix June 30
Spanish Grand Prix July 31
British Tourist Trophy Race Aug. 17
Akron Aug. 18
National Air Races and Show, Cleveland, Aug. 24-Sept. 2
European Grand Prix, Italy Sept. 8
Syracuse Aug. 31
Altoona, Pa. Sept. 2
Cleveland Sept. 15
Salem, N. H. Oct. 12

S. A. E.

Summer Meeting, Saranac Lake June 25-28
Aeronautic Meeting, Cleveland Aug. 26-28
Production Meeting, Cleveland Oct. 2-4
Annual Meeting, Detroit Jan. 21-24

SALONS

Hotel Drake, Chicago Nov. 9-16
Hotel Commodore, New York City Dec. 1-7
Hotel Biltmore, Los Angeles Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1